

## CHAPTER XXII

# The Flow of Supplies

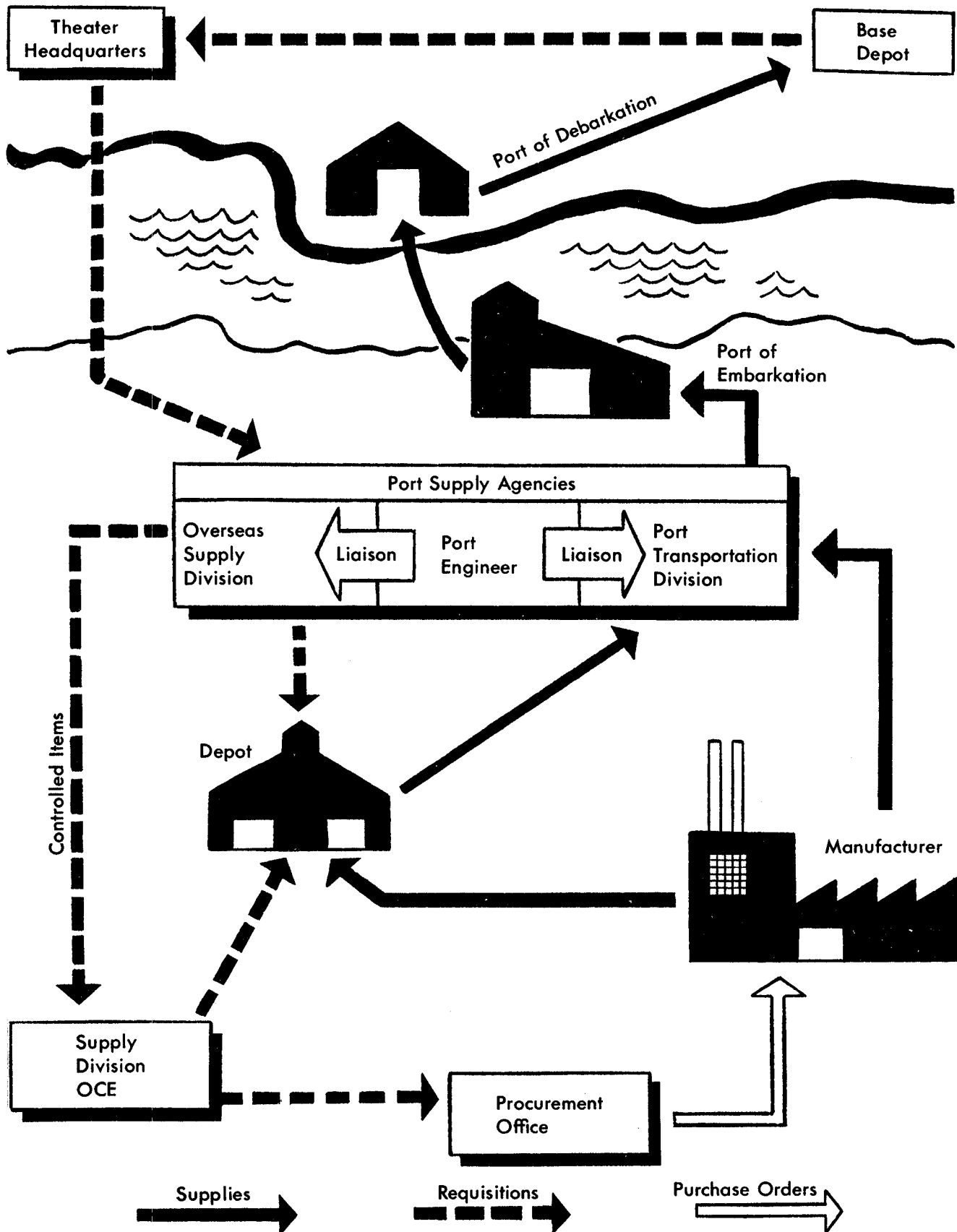
The ultimate result of the great upsurge in deliveries that began in the fall of 1942 was the gradual easing of shortages of supplies in the theaters. The demands from overseas were of course much greater than in the early months of war. Less than 63,000 engineer troops were stationed outside the United States in July 1942; a year later there were that many in North Africa alone. Beginning in December 1943 the number of engineer soldiers overseas surpassed the number at home, increasing month by month until in April 1945 there were 582,935 officers and enlisted men serving in the overseas commands, the pattern of engineer troop deployment following, as would be expected, that of the Army as a whole. (*See Chart 5.*)

### *Evolution of the Supply System*

The immediate result of more plentiful stocks in all of the technical services was the emergence of an orderly system of distribution. Although in 1943 there were still instances of last-minute purchases to fill shortages of units alerted for overseas movement and to satisfy unexpected Class IV requisitions, this method of supply became less common as the year wore on. During 1942 many needs had perforce to be met on a retail basis. Purchase by requisition and

shipment direct from factory to newly activated unit or to port was a common occurrence. In 1943 production made possible the desired conversion to wholesale operations. Only at the very end of the supply pipeline did retail activities continue. Elsewhere matériel was handled in bulk, flowing from factory to designated depot in the United States whence it was called forward at the appropriate time for shipment to troop unit or to theater. Control of that part of the matériel that was moving overseas was largely in the hands of the major ports, which had been assigned responsibility for the supply of particular theaters or bases. For the vast majority of items the requisition channels were direct from theater to port to depot. A selected group, in general those known to procurement staffs as "critical" items, became, for the purpose of distribution, "controlled" items. Requisitions for controlled items went from port to technical service for a check upon theater priorities, rather than direct from port to depot. (*Chart 8*) With the maturation of the wholesale system, the depots—heretofore small depositories for slow-moving, largely obsolete equipment—came into their own. Their importance, first apparent in relation to the distribution of matériel, was to grow as the quantities of supplies in storage and the rate at which they were being issued

CHART 8—ORGANIZATION AND PROCEDURES FOR DISTRIBUTING SUPPLIES



Source: Engr Supply Procedures, Mar 45, EHD files.

became the major determinants in the computation of the Army's requirements.<sup>1</sup>

In developing its storage system the Corps of Engineers was guided by policies set forth by the War Department and, more particularly, by ASF, which looked in turn to the Quartermaster Corps as the most experienced "supplier" in the Army. The Engineer supply system was in Dawson's bailiwick, which, it will be recalled, was the Requirements, Storage and Issue Branch. Those officers and civilians whose concern was storage and issue had attempted, during 1942, to provide the fundamentals of an efficient system. Their first concern had been the acquisition of space itself. In July 1941 the Engineers maintained storage facilities in five depots administered by The Quartermaster General for the War Department: at Brooklyn and Schenectady, New York; Columbus, Ohio; San Antonio, Texas; and San Francisco, California. Total space available was well under a million square feet. During the succeeding twelve months there was but a modest expansion of storage areas to somewhat over 5,000,000 square feet. The greatest additions occurred in the last six months of 1942. By January 1943 storage facilities under the control of the Corps had reached 36,900,000 square feet. By the summer of 1943, when distribution and control of stocks began to assume a position of importance equal to that of procurement, the Engineers had 42,900,000 square feet of storage space available to them. Over the course of the next twelve months the Corps added another 18,000,000 square feet. Engineer storage installations were, moreover, scattered all over the country in eight Engineer depots and eight ASF depots administered

by The Quartermaster General. (*Chart 9*) At the end of the war storage space totaled 64,000,000 square feet.<sup>2</sup>

No problem of identification or location of stocks had arisen in the old days. Simple manual bookkeeping sufficed to keep track of what was on hand and what was shipped in or out. Frequent physical inventory was entirely feasible. With thousands of items due to be stocked over large areas and to be moved rapidly when and where called for, such country store procedures had to be replaced by modern business practices. The new system of stock control was built around the use of electric accounting machines, commonly known as IBM machines after the International Business Machines Corporation, which supplied most of them. The IBM machines could do all sorts of tricks, but they were less than human. They could supply the correct answer only if correct data were fed into them. The machines could not know, as did an experienced depot clerk, that a tractor, heavy, 70 horsepower, and a tractor, D-7, were one and the same. It was essential therefore that each item handled be assigned a standard name and number.

But Dawson was not at first convinced of the necessity for complete coverage. He believed the Engineers could get along with

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<sup>1</sup> See Leighton and Coakley, *Global Logistics and Strategy*, Ch. XIII, and pages 642-48, and Wardlow, *Transportation Corps, I*, 95-111 for exposition of the supply system with particular reference to the duties of the port. Risch, *Quartermaster Corps, I*, Ch. IX, contains much detail on storage operations. These sources have served as a basis for much of the discussion that follows.

<sup>2</sup> (1) Monthly Rpt of Depot Opns, Jul 41. Distr Div file. (2) MPR, Sec. 2-H, Supplement Storage Opns, 30 Sep 42-31 Dec 45. (3) Speech by Dawson, 8 Feb 43, sub: Depot Relations (cited hereafter as Dawson Speech). Intl Div file, 400.24.

a catalog which listed only Class II supplies. This had been the practice in the past, of course, because the Corps carried no Class IV items in stock. The 1942 catalog, like previous ones, was divided into three parts—Part I, an alphabetical listing of sets with their component items; Part II, an alphabetical listing of items (including components of sets); Part III, a listing of organizational sets of spare parts for machinery. Omitted from the catalog entirely (unless they occurred also in Class II lists) were Class IV supplies and nonstandard equipment, even though the latter might be offered as a substitute for a standard item. The spare parts listed were similarly selective. A nine-digit stock number was assigned each item in Part II of the catalog; no stock numbers were assigned to spare parts. The Tabulating Section of the Storage and Issue Branch, which was in charge of seeing to the installation of the IBM system, prepunched sets of machine records cards and forwarded them to the depots.<sup>3</sup>

The 1942 catalog was hardly off the press before serious shortcomings became apparent. Nomenclature was anything but standard. Listings on the T/BA differed from those in the catalog and listings in one part of the catalog differed from those in another. The spread of stock numbers was insufficient to allow orderly insertion of the many new items being adopted for issue. The Corps had nothing like a complete accounting of stocks on hand.<sup>4</sup> Depots were carrying items on back order when perfectly acceptable substitutes were in stock. As one officer noted in August 1942:

No system seems to be in existence whereby depots are informed of substitutions. Since the editing of incoming requisitions is performed by lower bracket employees who in many instances do not know whether the item

has wheels or can be put in the vest pocket, an intelligent substitution cannot be made without a guide.<sup>5</sup>

Dawson, persuaded by this time that stock control was an all-or-nothing proposition, agreed that the only thing to do was “to wash the slate clean and start all over again.”<sup>6</sup>

Starting over again and doing a thorough job was a formidable task. Capt. Coleman P. Cook, the chief of the Tabulating Section, reported the state of affairs in mid-September:

The task of setting up complete nomenclature on cards for . . . Parts I and II of the catalog is proceeding. Cards have been punched through the letter “E.” . . . Colonel Holt [of the War Planning Section] has approved bringing the cataloging of new items to a temporary halt until the catalog group can digest recent heavy influx of new equipment in connection with War Aid, barrage-balloon equipment, searchlight cleaning and preserving materials, motorized shop equipment, reproduction equipment, amphibious force supplies, T/O equipment and non-standard items actually on hand at depots.

Pressure of work had prevented the catalog group from putting out a complete list of items cataloged so far.<sup>7</sup>

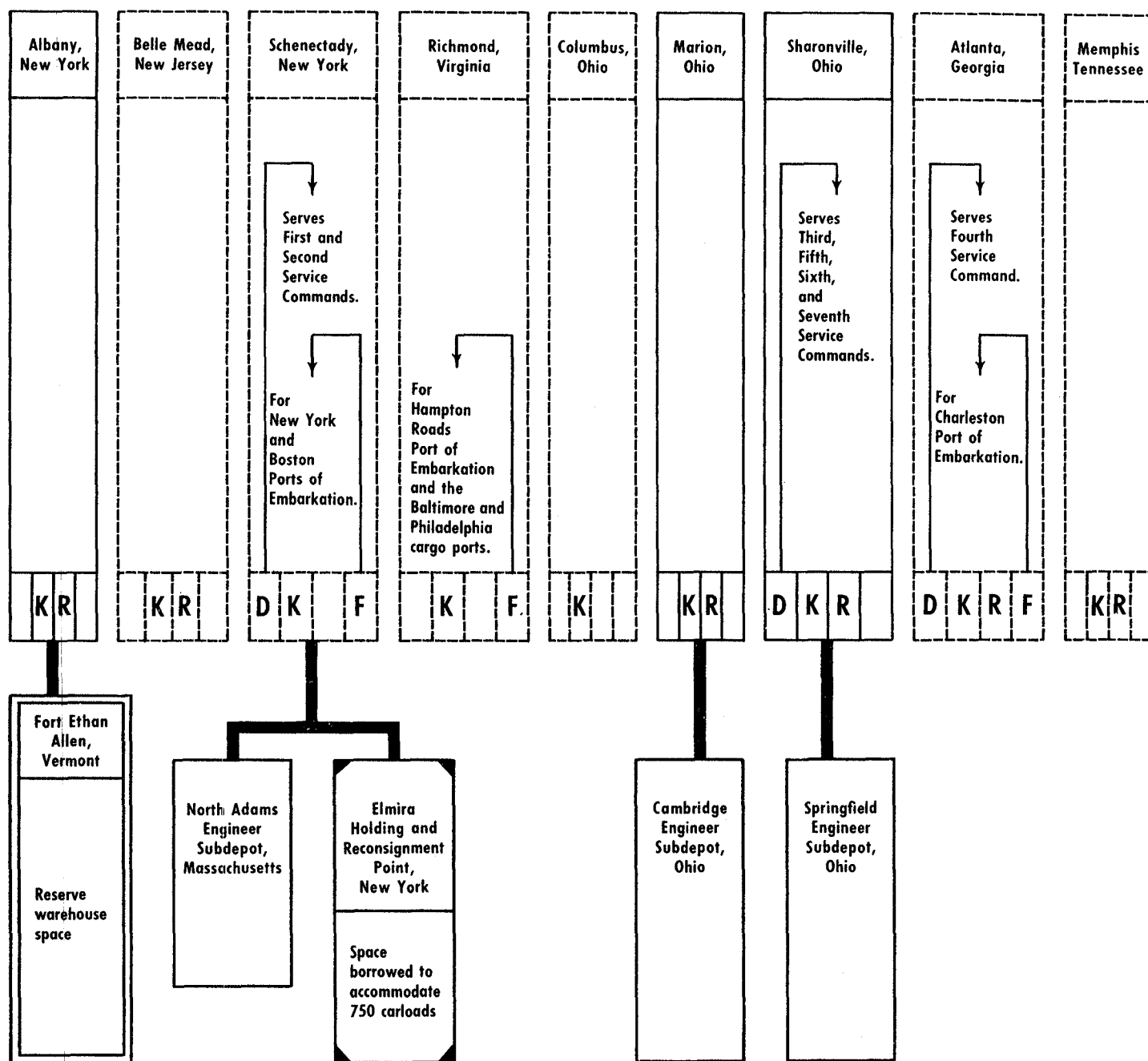
<sup>3</sup> (1) Dawson Speech. (2) CE Sup Catalogs, 1941, 1942. (3) Ltr, ExO Sup Div to Engr Sup Off Utah Gen Depot, 30 Dec 41, sub: Listings of Pts I and II of New Engr Sup Catalog. 400.34. (4) Memo, C of Rqmts Br for C of Requisition Sec, 8 Jul 42, sub: Catalog Number. Constr Mach Br file, Standardization of Tractor. (5) Ltr, AC of Rqmts Br to Engr Sup Officer Columbus Gen Depot, 13 Feb 42, sub: Engr Catalog, Pt. 2. 400.291, Pt. 7.

<sup>4</sup> (1) Dawson Speech. (2) Memo, C of O&T Br for Sup Div, 3 Aug 43, sub: Nomenclature. 400.34, Pt. 43. (3) Tabulating Sec Diary, 4 Aug 42, 16 Sep 42. Rqmts Br file.

<sup>5</sup> Tabulating Sec Diary, 20 Aug 42.

<sup>6</sup> Dawson Speech.

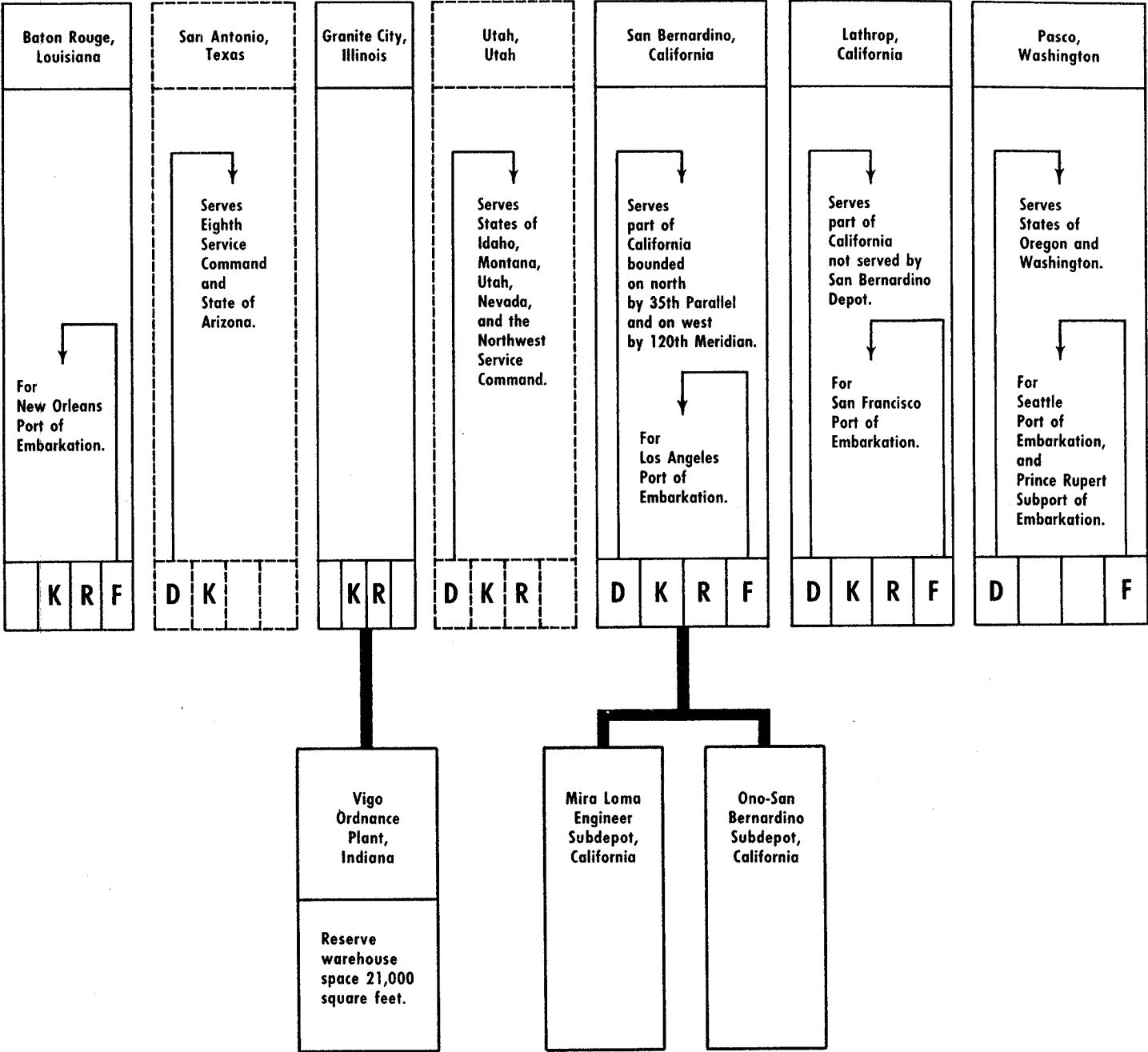
<sup>7</sup> Tabulating Sec Diary, 16 Sep 42.



**Explanation of Depot Symbols:**

- D** Distribution depot: A depot set up for the supply of certain items to a specified continental area in accordance with an established plan.
- K** Key depots: A depot designated for the purpose of centrally storing selected items to supply stations, other depots, and ports.
- R** Reserve depot: A depot storing designated items in bulk for special purposes as well as supplies in excess of current needs. Generally such depots made bulk shipments to other depots and ports of embarkation.
- F** Filler depot: A depot designated to store and issue supplies to ports of embarkation for filling overseas requisitions or supplying last minute shortages.

DEPOTS: JULY 1944



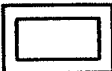
Engineer sections at ASF depots.



Engineer depots.



Engineer space at Transportation Corps holding and reconsignment point.



Engineer space assigned at post, camp or station under jurisdiction of service command.

Expansion of the Engineer supply system got under way during the period when the shortage of officers was most acute and came into full operation just as civilian manpower was becoming difficult to obtain. A large force of officer-managers, civilian clerks, and common laborers suddenly had to be built up from scratch to carry out duties with which the Corps of Engineers had almost no experience and which were regarded in some quarters as of little importance. Fowler sensed trouble ahead as early as March 1942. So far, he complained to Military Personnel, the officers assigned to supply duties had been too young, too inexperienced, and too few. This trend should be reversed. Urging that "supply duties should be put on an equal basis with troop duty and construction duty," he asked for twenty qualified officers a month beginning 1 May.<sup>8</sup> Military Personnel found it impossible to keep up with the demand for supply officers. In August Military Personnel was planning to assign about 150 officers from the Engineer Officer Replacement Pool, the hopper that contained Reserves, men commissioned direct from civil life, and OCS graduates. The hope was that most of these men would have an opportunity to attend the Engineer supply school at Columbus Depot before assignment, but "the urgency of personnel requirements" might make it necessary to train them after they arrived on the job at port or depot.<sup>9</sup>

The "urgency of personnel requirements" was evident. Dawson was asking for 282 additional officers at this time. The new depots at Granite City, Illinois, and at Marion and Sharonville, Ohio, went for weeks without officers. By early 1943, however, every Engineer installation had its commanding officer, every port its Engineer. All told there were at this time approximately 275 officers

and 15,000 civilian employees at Engineer depots. The total of 11,459,000 square feet of warehouse and shed space was 54 percent occupied; the 25,443,000 square feet of open storage area, 43 percent occupied. Engineer depots had 111 fork-lift trucks, 97 towing tractors, and 88 cranes. The month before, 197,821 tons of matériel had been received and 57,598 tons shipped out.<sup>10</sup>

The Engineer Field Depot Office (EFDO) which had been located at Columbus, Ohio, in accordance with the general policy of decentralization, assumed primary responsibility for supervision of depot activities early in 1943. Under the direction of Maj. Stonewall J. Beauchamp, EFDO worked out the necessarily detailed procedures for receipt and shipment, packing and marking, transportation, records keeping, and utilization of space. The Depot Operating Procedure Manual, published early in 1943, provided a step-by-step analysis of the principles of good warehousing. Trouble shooters from EFDO and from ASF traveled about from depot to depot, inspecting, suggesting, trying to discover ways to speed the movement of supplies. Everywhere that Beauchamp and his assistants went they emphasized "flow," particularly the flow of paper. For handling requisitions one representative left at the Utah Depot

<sup>8</sup> Memo, C of Sup Div for C of Mil Pers Br, 21 Mar 42, sub: Pers for Engr Sup Function at Div Camps. 400, Pt. 1.

<sup>9</sup> (1) Ltr, C of Mil Pers Br to CG SOS, 4 Aug 42, sub: Engr Off Repl Pool at Depots and Ports. Storage Br, Read file. (2) Ltr, TAG to Cs of Arms and Svs *et al.*, 20 Feb 42, sub: Off Filler and Loss Repl. 320.2, Pt. 31.

<sup>10</sup> (1) Memo, C of Rqmts Br for C of Mil Pers Br, 6 Aug 42, sub: Off Pers Rqmts for Engr Depots. Storage Br, Read file. (2) Memo, C of Sup Div for C of Mil Pers Br, 2 Oct 42, sub: Allot of Offs for Newly Activated Depots. 210.3, Pt. 1. (3) Dawson Speech. (4) MPR, Sec. 2-H, Sup Storage Opns, 30 Sep 42-31 Dec. 45.

fifteen pages of instructions detailing every step, starting with the time the mail should be picked up.<sup>11</sup> Late in June, after he had compared the filling of requisitions and back orders during selected one-week periods over the last six months, Beauchamp concluded that the depot system was performing in an excellent manner, and even ASF conceded that considerable improvement had been made. On the average, it was reported, it took fourteen working hours to fill a requisition.<sup>12</sup>

Development of a comprehensive stock control program was also thought to be progressing satisfactorily. The model was the ASF stock control manual which laid down basic principles and uniform procedures looking toward the closer alignment of stocks on hand with the Army Supply Program. Reacting to an advance copy of the manual, Fowler named Lt. Col. Charles R. Rodwell, Jr., Director of Stock Control, to act as staff officer to Dawson. Rodwell wanted a small, high-powered staff. He was able to select one or two experienced employees from other offices of the Supply Division, but it took him three and a half months to fill all of the ten established positions.<sup>13</sup>

Despite this shortage of personnel Rodwell's office plunged into the work immediately. By early May it had got out an Engineer edition of the ASF stock control manual for stations and depots. The new procedures for the first time called for the establishment of stock levels. Station supply officers were to estimate quantities sufficient to cover a 90-day period and were to re-order when one third of the stock had been issued. Depots were to police the stations within their area. Each quarter the Engineer station property officer was to prepare a report showing for each item

stocked its maximum level, balance on hand as given on stock record cards and as shown on a memorandum receipt account, quantities due in and due out, and cumulative issues for the quarter reported. Comparison of quarterly stock status reports would enable the depots to revise station levels, subject to review by the Director of Stock Control. Stock levels at the depots themselves were fixed at the quantity issued over the last five months (January–May 1943). Any balance over and above this amount became a reserve subject to the control of OCE. Revision of depot levels would be a joint responsibility of the depot and the Director of Stock Control. Replenishment by direction of the Storage and Issue Branch would ordinarily be automatic, but depots were to notify that office if stocks of any item fell below 50 percent of the authorized level.

The primary instrument for maintaining and adjusting stock levels was the consoli-

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<sup>11</sup> (1) GO 6, 14 Jan 43. (2) Ltr, ACofEngrs (Fowler) to All Concerned, 29 Apr 43, sub: Stock Control Procedure. EHD files. (3) Memo, Lt James M. Roche for Beauchamp, 5 Mar 43, sub: Final Rpt Engr Sup Sec Utah QM Depot, with Incl, Depot Flow of Requisitions and Ship Tickets. 333.1, Pt. 1.

<sup>12</sup> (1) Memo, Beauchamp for Dawson, 28 Jun 43, sub: Comparative Sum of Requisitions Received and Back Orders Released. Storage Br, Read file. (2) Ltr, C of Storage Br for Plans and Analysis Br Storage Div ASF, 10 Jul 43, same sub, with 1st Ind, 17 Jul 43. 400.312, Pt. 8. (3) Memo, Dir of Stock Control for C of Inventory Control Br, 30 Jul 43, sub: Proposed Monthly Depot Space and Operating Statement. 400.242, Pt. 2.

<sup>13</sup> (1) Memo, Fowler for Chorpeneing *et al.*, 23 Mar 43, sub: Balance of Proc and Control of Stocks. Intl Div file, 310.1. (2) Memo, Dir of Stock Control for C of Sup Div, 17 Apr 43, sub: Orgn and Immediate Objectives of the Office of Dir of Stock Control. Exec Office Proc Div file, Adm Inter-Office Memos. (3) Memo, Dir of Stock Control for C of Fld Sv, 5 Jul 43, sub: Progress of Dir of Stock Control. 400.291, Pt. 3.



dated stock status report. As of the close of business on Friday each depot listed the number, nomenclature, and maximum stock level of every item stocked, noted cumulative issues since the beginning of the year, and gave quantities on hand, due out, and due in. The individual reports were forwarded to the Granite City Depot where the former Tabulating Section, still under Major Cook, was now located. As put into final form by Cook's section, the consolidated stock status report served also as a basic tool in directing the flow of supplies to troop units and ports.<sup>14</sup>

If the depots had been stocked up to prescribed levels at all times the flow of supplies would have been automatic. Thus some installations, designated "distribution" depots, carried a balanced stock for the supply of troop units stationed within a prescribed geographical area. Others, the so-called "filler" depots, maintained supplies for shipment overseas upon call of a particular port. "Reserve" depots kept on hand stores which were drawn upon by distribution and filler depots and occasionally by the ports. Certain supplies—topographic equipment, for example—were concentrated in "key" depots. All of the Engineer depots served in more than one of these capacities. (*See Chart 9.*)

Although the flow of supplies was through designated points of the depot system to stations in the United States and through the ports to the theaters of war, the flow of paper which determined the movement of supplies passed through other points as well. The whole process can best be described by following a theoretical unit from the time of its activation to its overseas station. About 1 July 1943 the Organization and Equipment Section, located at the Granite City Engineer Depot, received notice that X General Service Regiment would be activated

at Camp Claiborne on 1 October 1943 and prepared an "initial activation requisition," forwarding three copies to the Engineer Section of the San Antonio ASF Depot for the supply of noncontrolled items, and one copy each to the commanding general of the Eighth Service Command, the Claiborne station supply officer, the commanding officer of the X General Service Regiment, and the Operations Section of the Requirements, Storage and Issue Branch, OCE. Upon receipt of the requisition from Granite City, the San Antonio Depot "edited" it to determine which items were and which were not in stock, shipping those on hand to Claiborne and sending one copy of the annotated requisition to the station supply officer. Those items out of stock but due in the San Antonio Depot within seven days were placed on "back order" to be shipped to Claiborne later. Those items out of stock and not due in within the week were "extracted" back to Granite City. Granite City, upon examination of the consolidated stock status report, found that the missing items were available at the Atlanta ASF Depot and directed Atlanta to forward them direct to Claiborne. Meanwhile, the Controlled Equipment Subsection of the Operations Section, Requirements, Storage and Issue Branch, had determined that the priority assigned the unit by the War Department was not sufficiently high to warrant the unit's receiving its tractors immediately. The unit would train with tractors from the equipment pool at Claiborne. Between the 1st and the 20th of September (not sooner than 30 days nor later than 10 days before

<sup>14</sup> (1) Ltr, ACofEngrs (Fowler) to All Concerned, 29 Apr 43, sub: Stock Control Procedure. EHD files. (2) Ltr, ACofEngrs to Stock Control Div ASF, 21 Jul 43, sub: Depot Stock Levels. 400.291, Pt. 9.

activation of the unit) all available equipment to which X General Service Regiment was entitled arrived at the camp. About midway in its 26-week training period X Regiment's commanding officer received notice of the unit's having been scheduled for movement overseas and of its consequently higher priority for equipment. Claiborne's supply officer filled in what shortages he could from station stocks and then requisitioned San Antonio, which forwarded supplies on hand and extracted missing items to Granite City. The Controlled Equipment Subsection, OCE, had meanwhile authorized Granite City to obtain for the regiment the tractors and other controlled items due it. Having arrived in the British Isles just before D Day, the X General Service Regiment subsequently participated in the reconstruction of the port of Cherbourg. The list of Class IV supplies needed for this operation had been submitted to the War Department by the theater in the form of a keyed project in August 1943. Some months later the New York port received the actual requisition for supplies. The Engineer Section of the port edited the requisition, referring controlled items to OCE and noncontrolled items to the Engineer Section of the Schenectady ASF Depot. The field liaison office of the North Atlantic Division kept tab on movements, contacting as necessary OCE, the depots, and the Engineer Section of the New York port until matériel had been loaded and shipped.<sup>15</sup>

In summarizing the steps taken to install the new system, Rodwell offered a few words of warning to his colleagues:

There is a tendency among many in the Supply Division today to expect wonders by merely stating, "Now that we've got Stock Control . . . ." We do not have Stock Control! However, we do have an apparently

sound stock control plan, and the continual application of this plan will lead to correctly adjusted stocks. If all concerned aggressively and industriously apply this plan, kept constantly current with changing conditions, we can hope to approach "stock control."<sup>16</sup>

### *Stock Control in the Measurement of Requirements*

The approach to stock control proved full of pitfalls, the most serious of which were names and numbers. Dawson's new start resulted in the publication on 1 March 1943 of a standard nomenclature list (SNL) which included: (1) standard troop equipment appearing on T/BA's and T/E's either as components of units of equipment or as items of separate issue; (2) theater of operations equipment; (3) international aid supplies; (4) barrage balloon equipment; (5) maintenance equipment and supplies; and (6) miscellaneous, nonstandard, and obsolete equipment. Omitted from the list were spare parts procurable only from the manufacturer of the particular machine, one-time purchases, emergency purchases, and certain international aid supplies. Items had been grouped under the Federal Standard Stock Catalog Classification, resulting in a twelve-digit decimal system.

Publication of the SNL and of a revised

<sup>15</sup> (1) Ltr, ACofEngrs (Fowler) to Engr Sup Offs QM Depots *et al.*, 26 Mar 43, sub: Transfer of Certain Functions to Granite City Engr Depot. 323.3, Granite City Engr Depot. (2) Ltr, ACofEngrs to All Concerned, 29 Apr 43, sub: Stock Control Procedure. EHD files. (3) C/L 2248, 2 Jul 43, sub: Activation of Fld Liaison Office NAD. (4) Ltr, C of Fld Sv to COs Engr Depots *et al.*, 16 Jul 43, sub: Back Orders for Overseas Shipment. 400.291, Pt. 2. (4) Ltr, ACofEngrs to NAD Engr, 14 Apr 43, sub: Estab of Engr Port Liaison Office. Rqmts Br Noncontrolled Equip Sec file, 320.2.

<sup>16</sup> Memo, Dir of Stock Control for C of Fld Sv, 5 Jul 43, sub: Progress of Dir of Stock Control. 400.291, Pt. 3.

catalog in October 1943 fell far short of solving the problem of identification. The habit of referring to items by their trade name or old stock number persisted in spite of formal orders that every document in the supply chain carry the standard name and number. A two weeks' survey in September revealed that 57 percent of the requisitions issued from OCE were without a stock number. Disinclination or inability to match up nomenclature used in the ASP or on papers from overseas with the SNL accounted for this situation in part. The main reason for it was the fact that the SNL was out of date. A good many persons in the Supply Division believed that the group charged with this work—one officer and twelve civilians including typists—was entirely too small to handle the job. Rodwell asserted, however, that the SNL would be put on a current basis within a short time and would thereafter be kept so. Recommendations for enlarging the staff were disapproved.<sup>17</sup>

Some 3,300 unnamed items continued to float through the Engineer supply system. The depots assigned them temporary numbers and referred a description to the Storage and Issue Branch for positive identification. Late in August EFDO dispatched representatives to the depots in an effort to reduce the number of items carrying temporary numbers. In November the Supply Division launched another "concentrated drive." This time representatives of the depots were to come to Washington to work with the chief cataloger. The hope was to clear the books by 1 January 1944.<sup>18</sup>

A large part of the confusion in the depots resulted from the poor caliber and inexperience of officers and civilians. Ultimately a few warehousemen turned up for direct commissions, but the bulk of officers at depots and ports of embarkation were

OCS graduates. Some of these younger men were not without experience, of course. Some of them, in fact, knew more than their seniors. But to most Engineer officers assignment to supply was the equivalent of exile to Siberia. There were no brigadier generals in depots. By and large OCS candidates of outstanding promise were siphoned off to troop units. Employment in Engineer depots averaged 20,000 persons over the last six months of 1943; 23,000 during 1944. If these workers had been experienced and steady, depots would have been adequately manned. Actually the depots suffered acutely from the so-called manpower shortage—a shortage not so much a lack of bodies as a scarcity of skills aggravated by a high rate of turnover and absenteeism among the labor force.<sup>19</sup>

<sup>17</sup> (1) CE SNL, 15 Apr 43. (2) C/L 2358, 7 Jul 43, sub: Use of Standard Stock Numbers and Nomenclature in All Transactions Affecting Engr Sup for Trps. (This was but one of a series of such pleas issued to the field.) (3) Memo, D. P. Kuntz for Comm on Sup Procedures, 18 Sep 43, sub: Asgmt of Standard Nomenclature and Stock Numbers. Intl Div file, 323.41–323.45. (4) Memo, Lt Col L. G. Flick for Col David H. Tulley, 25 Sep 43, sub: Comm on Sup Procedures: Rpt on Mtg of 23 Sep 43. Same file. (5) Memo, Maj C. G. Strong for Comm on Sup Procedure, 6 Oct 43, sub: Proposed Action re Standard Nomenclature Program. 020, Pt. 2. (6) Memo, C of Rqmts Sec for Rqmts and Stock Control Br, 8 Oct 43, sub: Reorgn of Standard Nomenclature Subsec and Allow and Catalog Subsec. Rqmts Br, Read file. (7) Memo, ExO Sup Div for C of Sup Div, 10 Apr 44, sub: Nomenclature and Catalog Sec. Same file.

<sup>18</sup> (1) Ltr, C of EFDO for COs Engr Depots *et al.*, 21 Aug 43, sub: Program for Identification of Depot Stocks. Opns Sec Storage Br file, Lt. Seaton. (2) Memo, Capt Davis, Rqmts Br, for Workman, EFDO, 27 Nov 43, sub: Unidentified Items in SNL. Rqmts Br, Read file.

<sup>19</sup> (1) Depot Opn and Changes. Basic Mats Submitted for Ann Rpt OCE, 1943. EHD files. (2) MPR, Sec. 2–H, Sup Storage Opns, 30 Sep 42–31 Dec 45.

On the west coast where vast new war industries had been created, the situation was particularly acute. "This office," wrote Maj. Sidney F. Bostick, commanding officer of the Lathrop Engineer Depot in January 1943, "has spent considerable time surveying the manpower shortage and is utilizing every conceivable method to procure help:

(1) Use of women laborers, white, black, Filipino and Chinese.

(2) Use of men under draft age, over draft age, any creed, color or religion.

(3) Use of paroled convicts.

(4) Sending trucks into the country to pick up Oakies, Arkies, or any other person who can make a mark or walk.

(5) Contacting every Government Agency available, including Chambers of Commerce in adjacent towns, requesting them to send laborers to this Depot for employment.

(6) Use of machines to offset the need of manpower.

(7) Transportation of employees to and from work."

Bostick was convinced "that this Depot has for laborers, the finest conglomeration of morons of any depot of the United States and that 98% of them having predicated their wants and needs on W. P. A. and relief salaries will not work when it rains or until they have spent their money after each pay day. As they can get a position in town at 40¢ an hour over their present salary, no disciplinary action can be taken with them."<sup>20</sup> By no means could all of the turnover and absenteeism be attributed to shiftlessness. Self-advancement in the form of higher pay remained an American ideal even in wartime. Sickness occurred more frequently among the older workers who had replaced younger drafted men. Many women found it difficult to hold down two jobs on a full-time basis.

The manpower shortage hit the depots hardest when it came to finding IBM clerks

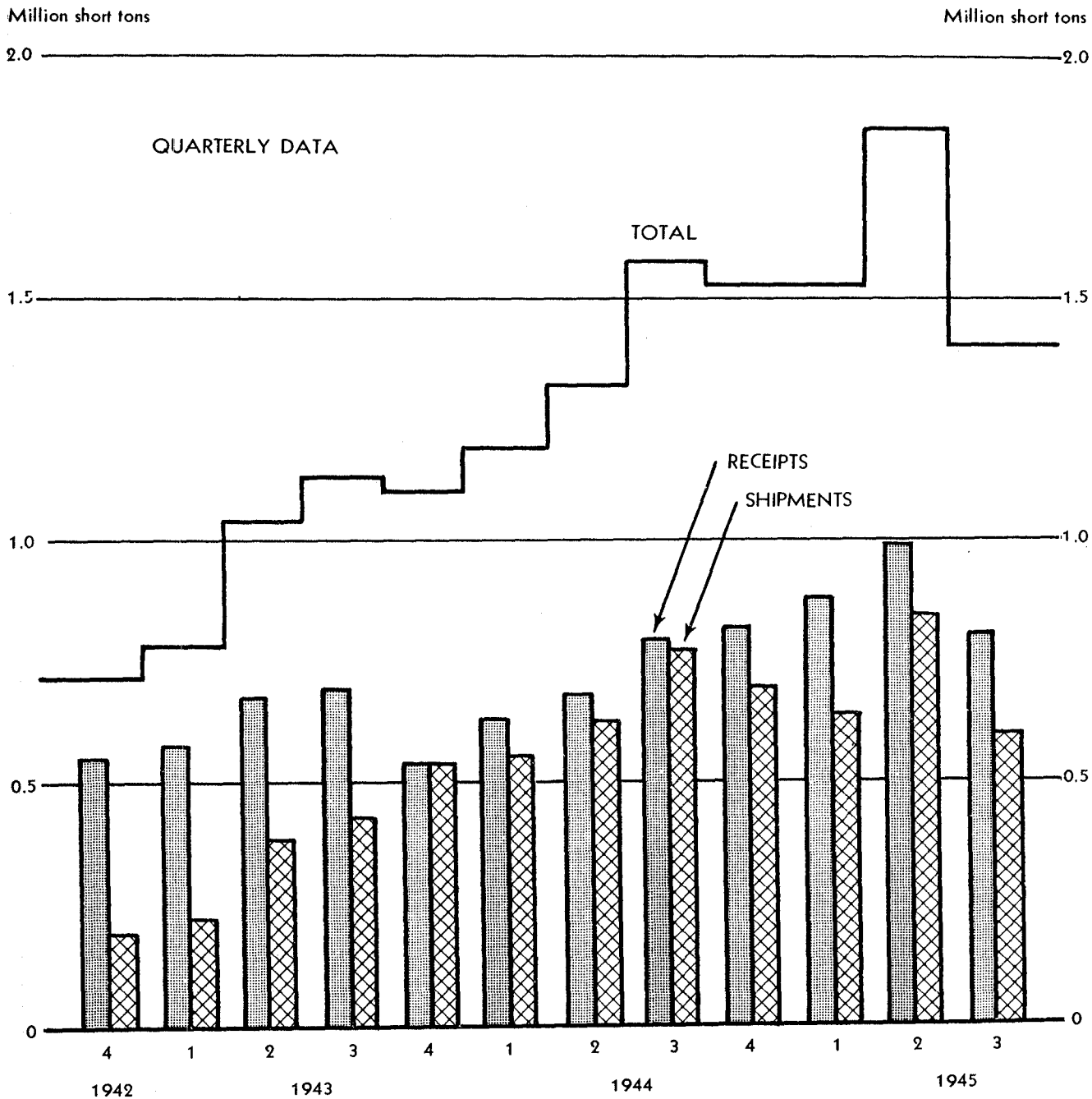
and supervisors. The IBM industry itself was young. Those who knew it were young, too. It took most persons three to four years to qualify as supervisors. In an effort to provide replacements for IBM experts called to service, the Engineers transferred employees from depot to depot and sent many to IBM schools and the AGO "brush-up" course, concentrating the while on women workers. In time some of the young men who had been drafted, particularly those who had been classified for limited service, were assigned as enlisted men to IBM work in the depots. Italian Service Units (prisoners of war) finally eased the shortage of laborers in depots in the west.<sup>21</sup>

Incompetence in the ranks of management and labor and lack of an airtight system of identification of stocks all but ruled out the possibility of efficient operations. Fortunately the supply system could absorb a great deal of inefficiency. By spring 1943, Engineer depots were handling over 300,000 tons of supplies a month. More significantly, shipments, rather than receipts, accounted for the greater part of the increase in work load. Total tonnage handled rose by 53 percent from the fall of 1942 to the fall of 1943. During this same period the volume of shipments increased 150 percent. (*Chart 10.*) Above all, the shortages of matériel which had everywhere prevailed during 1942 began in 1943 to be overcome in certain areas. By the end of 1943 stocks were being assembled in the United Kingdom at the rate

<sup>20</sup> Ltr, CO Lathrop Engr Depot to C of Rqmts Br, 25 Jan 43, sub: Survey of Civilian Pers Situation, Lathrop Engr Depot. Storage Br file, Fld Sv.

<sup>21</sup> (1) Memo, ACofEngrs (Fowler) for Deputy CofEngrs, 10 Feb 44, sub: Scarcity of Trained Pers for EAM Opns in Depots. Storage Br, Read file. (2) Ltr, Engr Sup Off Utah ASF Depot, 17 Jun 44, sub: Monthly Depot Space and Operating Rpt, Reporting of Hours for Italian Sv Units. Same file.

CHART 10—TONNAGE HANDLED BY ENGINEER DEPOTS:  
SEPTEMBER 1942—SEPTEMBER 1945



Source: MPR, Sec 2-H, Supplement Stor Opns, 30 Sep 42-31 Dec 45.

deemed necessary to prepare for the cross-Channel invasion. In the Italian campaign engineer troops could have used many more dump trucks but otherwise were adequately equipped. In the Southwest Pacific, where construction in the jungles of New Guinea imposed tremendous demands upon power machinery, engineer troops were still having to get along with very little. In January 1944 only 5 percent of Class II equipment was adequately stocked. Whereas in July 1943 the theater had 45 days' supply of construction machinery on hand, by the following November stocks had shrunk to 10 days of supply and in February 1944 were still at that level. It was a fact nevertheless that even in that distant, low priority theater, operations were no longer subject to the extreme delays that had occurred at the beginning of the New Guinea campaign because more troops and more equipment were on hand than formerly.<sup>22</sup>

The Corps of Engineers was to point to this apparent success at the far end of the pipeline as deficiencies in the supply system became daily more obtrusive. Execution of the work was slow. Gone were the days, if indeed they had ever existed, when fourteen hours was the average time spent per requisition. ASF had set six days as the maximum processing time. In the fall of 1943, a large percentage of requisitions were taking a long time to process and backlogs and back orders were piling up. Countless hours were being wasted looking for things because stock location files were incomplete. Some depots were complying with the requirement to notify ports when extracts were made; others were not. Stock records were inaccurate. As a spot check the Storage and Issue Branch had the depots take an inventory of one item on a specified date and compared this count

with figures in the consolidated stock report. The variations were shocking:<sup>23</sup>

Depot	Percentage of Requisitions Processed in 7 Days or More
Granite City.....	24
Marion.....	37
Columbus.....	22
Richmond.....	25
Utah.....	65

Requisition Line Items			
Depot	Processed	Pending at End of Month	Percent
Albany.....	1, 285	488	38
Granite City.....	6, 687	2, 188	33
Lathrop.....	4, 149	2, 186	53
Marion.....	2, 036	1, 469	72

Requisitions				
Depot	On Hand	Submitted	Released	Held Over
Baton Rouge.....	11	4	2	13
Granite City.....	545	31	120	456
Marion.....	57	3	21	39
Sharonville.....	377	530	287	620
Atlanta.....	343	41	214	170
Columbus.....	490	14	316	188

. . . in some cases, EAM [IBM] report showed stock on hand of almost double the quantity shown on special inventory report . . . EAM report also showed stocks on hand that had not appeared in the special inventory reports, and the special reports showed stocks on hand that were not reflected in the consolidated stock report.

Since similar inconsistencies had frequently come to light in the normal day's work, the

<sup>22</sup> (1) Info from historians preparing volume, The Corps of Engineers: The War Against Germany, for the series UNITED STATES ARMY IN WORLD WAR II. (2) *Engineers of the Southwest Pacific*, VII, *Engineer Supply*, p. 112.  
<sup>23</sup> 1st Ind, Dir Stock Control to C of EFDO, 18 Dec 43, sub: Stock Control Data—Monthly Depot Space and Operating Rpt. 400.291, Pt. 3. Figures are for November.

Storage and Issue Branch had to conclude that the results of the spot check were typical of the accounts of several thousand items. In a strongly worded letter to all concerned, Fowler called for immediate reform.<sup>24</sup>

The proven inaccuracies of Engineer stock records were the more alarming because of ASF's determination to key future purchasing to amounts on hand and past rates of issue. The new approach was the essence of stock control and had therefore been in the wind ever since the inauguration of the stock control program in the summer of 1943. Reports of gross overprocurement on the part of the Army had not been borne out by investigations, but sufficient evidence existed to indicate that the time had come to think in terms of establishing lower ceilings upon the procurement program.<sup>25</sup> Clay sounded the keynote of the new approach in January 1944:

The first and major phase of our war production . . . called for the provision of the initial or capital issue for a rapidly expanding Army of 7,700,000, the provision of similar equipment for our Allies, and the provision of replacements, spares and operational requirements for the relatively small number of troops engaged in overseas operations in 1942 and 1943.

The provision of initial equipment on time necessitated establishing high production rates. This phase of war procurement is approaching completion and, except for comparatively few items, procurement for the future must be designed and scheduled to meet estimated replacements and operational requirements; production must closely approximate expenditures. Obviously, a still closer procurement control is essential to assure the requisite supply being available on time and to avoid the accumulation of surpluses. A high degree of coordination is essential between the branches responsible for the calculation of requirements, the scheduling of production, and issue and storage.<sup>26</sup>

It was a major part of Rodwell's job as the Engineers' Director of Stock Control to achieve the requisite co-ordination between requirements, procurement, and storage and issue.<sup>27</sup> As delineated in August 1943 and as applied to the 1943 procurement program, only Rodwell was to recommend extension or cancellation of contracts, or a revision of the ASP, "bearing in mind that a revision of the ASP is preferable to small changes in present procurement."<sup>28</sup> Although there were a number of cancellations and cutbacks during 1943, the Procurement Division tended to take as much as manufacturers offered and apply any resulting surpluses toward the 1944 ASP. The main consideration was to get the 1944 program as set up in the August 1943 ASP under contract as quickly as possible. So short-age-conscious was the Supply Division that Fowler requested ASF's permission to place orders to cover deliveries through December 1945 upon approval of the 1 February 1944 ASP. Fowler wanted to be able to assure Engineer contractors of future work so that they could hold onto their labor force, and he emphasized the fact that lead time for many items was from twelve to eighteen months. ASF was not persuaded. Special arrangements had been made to take care

<sup>24</sup> Ltr, ACofEngrs to Div Engrs *et al.*, 31 Dec 43, sub: Responsibility of Depot in Adequate Performance of Engr Sup. Opns Sec Storage Br file, Lt. Seaton.

<sup>25</sup> For a discussion of the investigations of the summer of 1943, see Smith, *The Army and Economic Mobilization*, Ch. III, pp. 89-97.

<sup>26</sup> Memo, Dir Mat ASF for Dir Purch Div ASF *et al.*, 28 Jan 44. Doc. 119 in Lt. Col. Simon M. Frank, *The Determination of Army Supply Requirements*. MS, OCMH.

<sup>27</sup> C/L 2359, 12 Apr 43, sub: Estab of the Office of the Dir Stock Control.

<sup>28</sup> Memo, C of Sup Div for Dir Stock Control, 17 Aug 43, sub: Proc of 1943 and 1944 ASP Rqmts. Exec Office Proc Div file, Adm Memos.

of items with inordinately long lead time. Otherwise procurement contracts would be limited to required production through December 1944.<sup>29</sup>

Although these and similar ASF pronouncements were rather clear indications of the way the wind was blowing, it was not until January 1944 that the matter took on hurricane proportions and the Procurement Division's world began to topple. On 12 January at 4:45 p. m. that office received from the Control Division, ASF, a copy of a report which charged the Corps of Engineers with thirty-two cases of having contracted for more than the total quantity authorized by the 1943 and 1944 programs combined. The Procurement Division thought the charge unwarranted. Half of the items said to be "overprocured" were merely "overrequisitioned." Orders might be canceled long before deliveries materialized. In other cases authorization to increase requirements was pending. But there was no blinking the fact that ASF's Production Division held strong convictions about the way the Engineers were handling their procurement program. Not a few weeks previously, the Procurement Division had been told informally that percentagewise on the basis of total program the amount of the Corps' overprocurement was greater than that of any other technical service. But Fowler believed the Engineers had an excellent general defense in the obvious difficulty of estimating requirements for Class IV supplies.<sup>30</sup>

ASF was not impressed. Procurement must be brought into immediate alignment with the ASP and kept there.<sup>31</sup> When the Engineers compared the quantities in the 1 February 1944 ASP—quantities that had been reduced by about 25 percent as a result of the recomputation of replacement

factors ordered by ASF—with the quantities on order, they discovered "many instances" where 1944 required production had "already been exceeded."<sup>32</sup> ASF permitted the Corps to reschedule many contracts into 1945 because engines were involved. Even so the Procurement Division was faced with the necessity for canceling or cutting back more than 200 contracts.<sup>33</sup>

Stricter regulations for welding together the determination of requirements, the scheduling of procurement, and the stockage and rate of distribution of matériel were in preparation. On 7 March 1944 ASF inaugurated the Supply Control System, which gradually replaced the Army Supply Program as the primary statement of requirements. The Supply Control System recognized two categories of items. Principal items (P items) took in all the former criti-

<sup>29</sup> (1) *Ibid.* (2) Memo, ACofEngrs (Fowler) for CG ASF, 6 Sep 43, sub: Proc of Munitions. 470, Pt. 2. (3) Memo, Actg Dir Mat ASF for Fowler, 23 Sep 43, same sub. Same file. (4) Memo, Dir Mat ASF for CofEngrs *et al.*, 3 Aug 43. Same sub. OQMG file, 471.

<sup>30</sup> Memo, ACofEngrs (Fowler) for Actg CofEngrs (Robins), 12 Jan 44, sub: Rpt. of Maj Xiques, ASF, as to Overproc of Engr Items. Exec Office Proc Div file, Engr Equip, Misc 3.

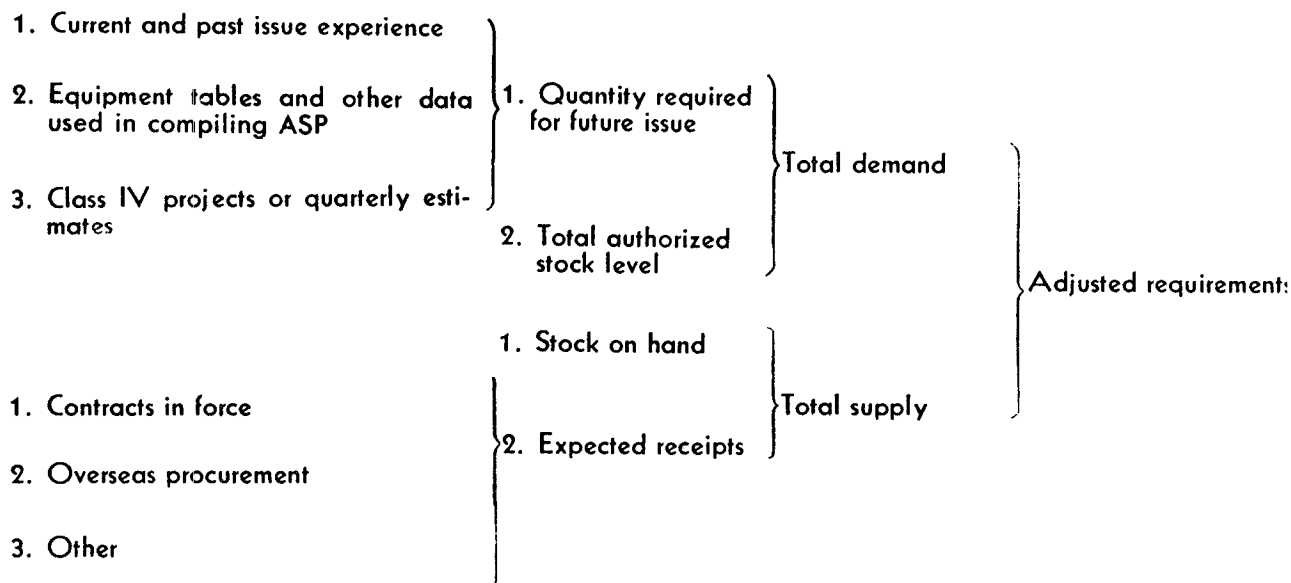
<sup>31</sup> Memo, Dir Prod Div ASF for CofEngrs *et al.*, 29 Jan 44, sub: 1944 ASP—Policies Affecting Prod. Exec Office Proc Div file, Cancellations or Cutbacks to Jul 44.

<sup>32</sup> (1) Memo, C of Alloc and Contract Br for C of Proc Div, 20 Mar 44, sub: Mtg of Div Engrs on 28 and 29 Mar 44. Exec Office Proc Div file, Divs or Dists, Misc to All. (2) Memo, C of Rqmts Br for C of Sup Div, 27 Aug 43, sub: Rev Maint Factors. Exec Office Proc Div file, Engr Equip—Spare Parts 1.

<sup>33</sup> (1) Memo, ACofEngrs for Mil Sup (Fowler) for Dir Mat ASF, 8 Feb 44, sub: 1944 ASP—Policies Affecting Prod. Exec Office Proc Div file, Cancellations or Cutbacks to Jul 44. (2) Speech, C of Proc Div, 28 Mar 44, sub: Procedures with Respect to Cutbacks, Rescheduling and Cancellations. Exec Office Proc Div file, Divs or Dists, Misc to All.



CHART 11—ELEMENTS OF SUPPLY AND DEMAND STUDIES, SUPPLY CONTROL SYSTEM



cal or controlled items as well as newly adopted equipment or equipment on which for other reasons there had been little opportunity to accumulate issue experience. All items not P items were designated secondary items (S items). The computation of requirements for P items and the resulting adjustment of procurement schedules had to be undertaken at least once a quarter as compared with the semiannual revision of the ASP. S items were studied at less frequent intervals and in less detail. The requirements computations, known as "supply and demand studies," were derived from the information shown on Chart 11.<sup>34</sup>

As interpreted by Col. Fred G. Sherrill, chief of the Procurement Division, to a conference of Division Engineers, the Supply Control System was aimed at "the almost impossible task of always having enough supplies on hand without ever having a surplus . . . ." Cancellations and cutbacks were "a necessary evil" which would "have an unhealthy effect" on contractors. Predict-

ing that it was going to be more difficult to meet the ASP in 1944 than it had been in 1943, Sherrill warned the conference against allowing the new policies to interfere with the main job, which was still the attainment of high rates of production.<sup>35</sup>

### *The Procurement Peak*

The Engineer portion of the 1 February 1944 ASP was valued at \$1,772,000,000—an amount some \$400,000,000 more than the value of total deliveries in 1943. At the time Sherrill spoke, in March 1944, the shortage of engines, transmissions, axles, and other components was continuing to have an adverse effect upon production and it was becoming harder and harder to hire competent labor. In other areas, however, there

<sup>34</sup> Smith, *op. cit.*, Ch. III, pp. 97–99.

<sup>35</sup> Speech, C of Proc Div, 28 Mar 44, sub: Procedures with Respect to Cutbacks, Rescheduling, and Cancellations. Exec Office Proc Div file, Divs or Dists, Misc to All.

had been marked improvement. Manufacturing capacity—thanks particularly to the opening of the new tractor and shovel facilities—was at last ample, the supply of materials was more plentiful, and the use of Chrysler engines was beginning to pay off.

The essentiality of construction machinery was no longer questioned. After production of tractors dropped seriously in February 1944, General Knudsen, director of War Department production, helped the Engineers to get more favorable consideration from WPB. In May, WPB assigned crawler tractors, trailers and dollies, truck bodies, and items destined for immediate shipment overseas, a 100 percent AA-1 priority. Heavy tractors were put on the production urgency list, a step that made not only the tractor manufacturers but also those producing components eligible for higher manpower priorities. High priorities on materials, components, and labor, plus increased productive capacity, enabled the Engineers to procure 28,785 tractors, thereby exceeding by more than 2,000 the number originally scheduled for production in 1944 and meeting the goal established later in the year. Yet in spite of the record number of tractors produced in 1944, the supply of heavy types was insufficient to satisfy demand at the end of the year, and continued short through January 1945. After that month requirements fell and production was gradually cut back. The first cranes and shovels came off the assembly line of the new facility at Lima, Ohio, in March 1944. The Lima plant eventually produced 61 cranes and shovels per month. During 1944, a total of 4,682 crawler-type cranes and shovels were delivered to the Corps of Engineers. Requirements and production

were the same or almost so in all types.<sup>36</sup> (*Table 13*)

Although the unfilled demand for other types of construction machinery increased in the last month of 1944 and the first month of 1945, deliveries were large and generally in line with requirements. (*Table 14*) The situation as a whole was so much better in 1944 that in the latter half of that year the Engineers curtailed the used equipment program. In April 1945 the Redistribution and Salvage Branch directed the Great Lakes Division to confine its repairs to standard machines with a remaining life of not less than 75 percent that of a new machine.<sup>37</sup>

<sup>36</sup> (1) C/L 2995, 5 May 44, sub: Asgmt of Priority Ratings to Mil Sup. (2) Memo, C of Proc Div for C of Opns Br, 9 Mar 44, sub: Mtg with Gen Knudsen on Prod of Tractors, Cranes, and Shovels. Exec Office Proc Div file, Engr Equip, Misc 3. (3) Ltr, Dir Constr Mach Div WPB to R. G. LeTourneau, Inc., 5 May 44. Management Br Proc Div file, R. G. LeTourneau, Inc., Pt. 1. (4) Hist of Constr Mach Div WPB, p. 42. (5) See above, p. 525.

Tractor deliveries in 1944 cannot be compared with earlier figures. In January 1944 the War Department redefined the division of responsibility for procurement of tractors. The former arrangement whereby the Ordnance Department bought prime movers and the Corps of Engineers construction-type tractors had resulted in the two services getting production off the same lines in many cases. Under the January 1944 arrangement the Ordnance Department procured tractors operating over twelve miles per hour; the Corps of Engineers, those operating up to and including twelve miles per hour. The new arrangement increased the Engineer program. Maj. Ralph L. Appleton, History of Construction Machinery for Overseas Supply (typescript, c. 1945), pp. 47-48.

<sup>37</sup> (1) MPR, Sec. 6, 31 Jan 45. (2) Ltr, C of Redistr and Salv Br to Great Lakes Div Engr, 4 Apr 45, sub: Repair of Used Equip for Trp Issue. 400.5, Pt. 2. (3) Memo, C of Constr Mach Br for C of Proc Div, 29 Dec 44, sub: Daily Log 152, 28 Dec 44. Tech Br Proc Div file, Daily Log Dec 44. (4) Wkly War Plan Staff Conf, 6 Nov 44.

TABLE 13—TRACTORS, CRANES AND SHOVELS: ANNUAL REQUIREMENTS AS OF SELECTED DATES AND ACTUAL DELIVERIES

Item	1944			1945		
	Requirements		Deliveries	Requirements		Deliveries
	February	October		February	June	
Bulldozer, tank mounting for M-4, A-1, A-2, A-3 tank, hydraulically operated .....	500	1,400	1,398	0	0	0
Crane, tractor operated, non-revolving, 20-ton, 20-foot boom .....	0	300	325	357	257	178
Cranes and shovels, crawler mounted:						
$\frac{1}{2}$ -cubic yard, 5- to 6-ton, Class II .....	1,386	1,670	1,692	615	615	615
$\frac{3}{4}$ -cubic yard, 7- to 10-ton, Class III .....	2,327	2,219	2,200	2,011	1,661	1,205
1- to $1\frac{1}{2}$ -cubic yard, 20- to 30-ton, Class IV .....	575	371	345	590	511	348
$1\frac{3}{4}$ - to 2-cubic yard, 30- to 40-ton, Class V .....	238	372	350	331	325	140
$2\frac{1}{2}$ -cubic yard, 45- to 60-ton, Class VI .....	85	51	52	10	10	10
3- to 4-cubic yard, 65- to 75-ton, Class VII .....	47	43	43	0	0	0
Cranes and shovels, rubber tired:						
$\frac{3}{8}$ -cubic yard, 4- to 8-ton, Class X .....	779	772	775	1,364	1,150	456
$\frac{3}{4}$ -cubic yard, 8- to 12-ton, Class XI .....	566	473	471	696	0	439
$\frac{3}{4}$ -cubic yard, 14- to 18-ton, Class XII .....	720	683	693	639	(*)	300
$\frac{3}{4}$ -cubic yard, 20-ton, Class XIII .....	160	132	132	59	54	26
Single engine driven, self-propelled, 8- to 15-ton, Class XIV .....	559	558	474	752	290	290
Tractors, crawler type, diesel engine driven, complete with accessories:						
91 to 140 drawbar horsepower, Class I .....	3,238	2,983	3,130	3,484	3,484	1,986
61 to 90 drawbar horsepower, Class II .....	9,702	9,189	9,747	14,143	11,223	8,480
46 to 60 drawbar horsepower, Class III .....	4,787	4,776	6,433	5,702	3,469	3,153
36 to 45 drawbar horsepower, Class IV .....	8,930	9,436	9,475	5,792	4,648	3,525

\* Requirements not shown in available records.

Source: (1) ASP, Sec. 1, 1 Feb 44, 1 Oct 44. (2) MPR 22-G-X, 28 Feb 45. (3) MPR 22-G, 30 Jun 45. (4) Crawford and Cook, *op. cit.*, p. 25.

The Procurement Division met the needs for many types of new construction equipment only by using gasoline as well as diesel engines. Once production got under way the Chrysler plant maintained its schedules. Theater Engineers found gasoline engines much inferior to the sturdier industrial types and complained frequently on this score. But the die had been cast. In 1944 it was a choice between gasoline engines or much less construction machinery. Perhaps some officers would have chosen to get along with less machinery. Perhaps better maintenance facilities would have rendered complaints from overseas less numerous.<sup>38</sup>

As the United Nations pushed the offensive in Europe, requirements for all types of bridges rose. Canvas for the large numbers of pneumatic floats needed for the popular treadway bridge was in critically short supply. Various canvas and rubber crises were overcome in 1944, and the shortage of labor was relieved by the establishment of a pneumatic float making plant in an area of labor surplus. By the end of the year deliveries of 18-ton floats were just about equal to demand. On the basis of 144 treadways per set, the Engineers received 82 complete bridges in 1944 with additional replacement quantities of floats and saddles. In May 1944 the H-20 bridge was suddenly reinstated in the procurement program in order to supply bridging over the Ledo Road in Burma. The suddenness of the demand and delays in letting contracts made it difficult to secure steel for these bridges even with an emergency WPB directive. With the first H-20's not delivered until September, only 128 were received in 1944 against a requirement for 220. Production for 1945, scheduled farther ahead, was adequate, and 253 were made in the first eight months. The Engineers in 1944 also began

once more to buy the H-10 bridge, this time in a knockdown version which made for easier shipping. Requirements were known far enough in advance so that the full demand of 200 was met by the end of the year. By the time Japan surrendered, the Engineers had purchased 160 additional H-10 bridges.<sup>39</sup>

A success statistically, procurement of Bailey bridges was to all practical purposes almost a complete failure. Bailey bridge parts not only had to be interchangeable with each other but also with those parts made in England. The Chicago Ordnance District bought the gauges for the Engineers in 1942. Although inspected by the British representative, the gauges proved inaccurate, and reports that the parts were not interchangeable began to come in during 1943. The Engineer Board found that the master gauge could not be altered, and it was not until August 1944 that a new one was ready. Gauges were then altered and inspectors given instruction that was long overdue. In 1944 the Engineers bought 850 Bailey bridges, a quantity that was more than sufficient to meet overseas demands.

<sup>38</sup> (1) Memo, C of Components Sec Tech Br for C of Tech Br, 22 Aug 44, sub: Catalog Order Bd—Crane and Shovel Production. Management Br Proc Div file, Components. (2) Memo, AC of Components Sec for C of Tech Br, 16 Aug 44, sub: Engine Substitution. Exec Office Proc Div file, Engr Equip, Misc, Engines. (3) Memo, ACofEngrs War Planning for ACofEngrs Mil Sup, 6 Jan 45, sub: Expansion of Catalog Engr Production, with 1st Ind, 17 Jan 45. Management Br Proc Div file, Engines.

<sup>39</sup> (1) Engr Bd Hist Study, The Conservation of Critical and Strategic Materials in the Development of Engineer Equipment, pp. 66-67. (2) Ann Rpt OCE, FY 1945. (3) Memo, Robert F. Wise for C of Cen Planning Br Proc Div, 28 Jun 44, sub: Proc H-20 Bridges on Requisition EP-84729. Exec Office Proc Div file, Engr Equip, Misc 3. (4) MPR 20—ENG, 30 Nov 44. (5) Daily Log, Rqmts Br, 27 Jul 44. Rqmts Br file, Daily Log.

TABLE 14—CONSTRUCTION MACHINERY: ANNUAL REQUIREMENTS AS OF SELECTED DATES AND ACTUAL DELIVERIES

Item	1944			1945		
	Requirements		Deliveries	Requirements		Deliveries
	February	October		February	June	
Auger, earth, skid mounted, gasoline engine driven.....	234	191	206	231	231	117
Compressors, air:						
Trailer mounted, pneumatic tires, diesel engine driven, 315 cubic feet per minute.....	680	680	680	561	384	233
Truck mounted, gasoline engine driven, 105 cubic feet per minute.....	3,100	3,122	3,112	1,335	922	922
Crushing and screening plant, 2 units, gasoline engine driven, semitrailer mounted, 25 cubic yards per hour...	221	229	267	540	383	255
Distributors:						
Bituminous material, trailer mounted, 1,250 gallon.....	146	150	150	370	129	129
Water, truck mounted, 1,000 gallon...	200	250	234	273	313	242
Ditching machine, ladder type, crawler mounted, gasoline engine driven, digging depth 8 feet, width 18 to 24 inches.....	350	324	324	371	174	143
Graders, road:						
Motorized, diesel engine driven, 12-foot moldboard.....	1,825	1,825	1,825	2,088	2,411	1,154
Towed type, leaning wheel, hand controlled, 12-foot moldboard.....	634	541	541	537	291	149
Mixer, concrete, gasoline engine driven, trailer mounted, 14-cubic foot.....	500	291	364	801	452	352
Rollers, road:						
Gasoline engine driven, 3-wheel, 10-ton.....	600	628	592	804	346	310
Gasoline engine driven, tandem, 2-axle, 5- to 8-ton.....	480	309	309	808	461	278
Towed type, sheepsfoot, 2-drum-in-line.....	665	605	629	709	367	294
Rooter, road, cable operated, 3-tooth.....	280	220	220	298	159	63
Saws:						
Chain, portable, pneumatic, 24-inch blade.....	3,084	2,321	3,144	86	39	39
Chain, gasoline engine driven, 36-inch blade.....	4,054	4,054	4,054	4,560	1,738	1,738
Circular, woodworking, portable, pneumatic, 12-inch blade.....	5,559	5,451	5,232	248	1,581	1,451

TABLE 14—CONSTRUCTION MACHINERY: ANNUAL REQUIREMENTS AS OF SELECTED DATES AND ACTUAL DELIVERIES—Continued

Item	1944			1945		
	Requirements		Deliveries	Requirements		Deliveries
	February	October		February	June	
Scrapers, road:						
Motorized, cable operated, 12-cubic yard.....	389	383	383	352	537	262
Towed type, cable operated, 3½-cubic yard, Type I.....	557	498	498	168	91	91
Towed type, cable operated, 6-cubic yard, Type II.....	584	402	404	133	83	83
Towed type, cable operated, 8-cubic yard, Type III.....	1,430	1,337	1,336	1,747	890	716
Towed type, cable operated, 12-cubic yard, Type IV.....	500	500	526	1,075	560	540
Semitrailers:						
Front loading, without dolly, 20-ton....	(*)	400	1	8,914	6,207	2,082
Rear loading, with dolly, 20-ton.....	3,872	3,732	3,614	255	255	255
Trailer, full, low bed, 60-ton.....	55	51	51	74	74	69
Welder, electric arc, gasoline engine driven, 300 amp, skid mounted.....	2,700	2,821	2,068	2,200	1,752	1,020

\* Requirements not shown in available records.

Source: (1) ASP, 1 Feb 44, 1 Oct 44. (2) MPR 22-G-X, 28 Feb 45. (3) MPR 22-G, 30 Jun 45. (4) Crawford and Cook, *op. cit.*, pp. 25-27.

In the European theater, however, these American Baileys had to be set aside or carefully segregated from those of the British bridges because corrections in the gauges had come too late to provide the desired interchangeability. (*Table 15*)<sup>40</sup>

During 1944, the canvas shortage as well as a lack of engines interfered with production of water supply equipment. In order to produce 3,000-gallon water tanks, Engineer contractors needed the heaviest weight canvas. Partly because replacement rates were high in the Pacific, 1944 requirements were far greater than in 1943. Even with delivery

of over 16,500 tanks, shortages of canvas cut the supply to more than 1,350 below required production at the end of 1944. Because of the difficulty in getting canvas and because fungus growths in the Pacific caused canvas tanks to deteriorate rapidly, the Engineers turned to glass fiber cloth as soon as this fabric had been developed. Through the use of both canvas and glass fiber cloth—contracts for which were let in the fall of 1944—supply caught up with demand in

<sup>40</sup> (1) Incl, 31 Mar 44, with Memo, C of Proc Div for C of Prod Sv Br ASF, 10 Apr 44, sub: Monthly Rpt of Prod Difficulties. 400.12, Pt. 1 (C). (2) ERDL file, BR 341E.

TABLE 15—BOATS AND BRIDGES: ANNUAL REQUIREMENTS AS OF SELECTED DATES AND ACTUAL DELIVERIES

Item	1944			1945		
	Requirements		Deliveries	Requirements		Deliveries
	February	October		February	June	
<i>Boats</i>						
Assault, M-2, without paddles or canvas bag-----	377	377	377	10,639	4,823	2,657
Landing, pneumatic, rubber, 10-man-----	1,494	1,272	1,238	9,829	8,316	3,710
Reconnaissance, pneumatic, canvas, 2-man, without paddles-----	10,095	10,095	10,695	13,182	9,974	7,700
Storm, plywood-----	0	0	0	2,658	3,124	2,502
Utility, gasoline powered, 18-foot-----	873	523	546	1,800	1,824	537
Motor, outboard, with chest and spares, 22 hp-----	3,296	2,916	2,863	6,000	4,792	2,402
Motor, outboard, with chest and spares, 50 to 55 hp-----	2,407	2,074	2,618	2,892	2,600	1,386
<i>Bridges</i>						
Fixed, steel:						
Panel, Bailey type, M-2, widened roadway-----	700	856	850	604	396	385
Box girder, H-10, knockdown type-----	200	200	200	167	160	160
Box girder, H-20-----	150	220	128	364	250	252
Treadway, M-2:						
Float, pneumatic, with emergency kit, 18-ton, M-1, with carrying case-----	10,622	10,837	10,553	21,948	14,000	9,920
Saddle, steel, treadway, knockdown type, M-1, 18-ton-----	6,105	7,294	7,264	14,665	10,000	5,294
Truck, cargo, 6-ton, 6 x 6-----	1,500	1,292	1,143	2,499	1,204	773
M-3:						
Float, pneumatic, with emergency kit, 13-ton, M-3, with carrying case-----	8,699	8,908	9,098	3,628	4,617	4,617
Ponton:						
Steel, 25-ton-----	130	147	147	0	0	0

Source: (1) ASP, 1 Feb 44, 1 Oct 44. (2) MPR 20-ENG, 31 Dec 44, 31 Aug 45. (3) MPR 22-G-X, 28 Feb 45. (4) MPR 22-G, 30 Jun 45. (5) Crawford and Cook, *op. cit.*, p. 25.

1945 with deliveries of 20,760 in the first eight months.<sup>41</sup>

The Engineers' largest requirement for canvas was for covers and doors for portable airplane hangars. In the fall of 1944 the Engineers also revised these specifications to allow the use of glass fiber cloth. Because there were no further requirements for catenary-supported hangars by the end of 1944 and deliveries were satisfactory no covers were produced from glass-fiber cloth. Production limitations, however, resulted in an unfilled demand for 141 structural steel hangars, 130 by 160 feet. Although fiber glass doors were authorized to replace canvas in 1944, the Procurement Division was unable to get any deliveries until May 1945 because of deficiencies in the design. In the meantime, sufficient canvas was obtained so that by March supply caught up with demand.<sup>42</sup>

The success of the Engineer procurement program thus varied according to the item being bought. In the first half of 1944 deliveries were but 42.7 percent of the 1943 program, with monthly receipts well below the high set in December 1943. Then in August the Corps attained a record delivery of \$150,579,000. Increasing deliveries each month to a wartime peak of \$192,632,000 in December, the Engineers by purchasing equipment valued at more than \$1,778,000,000 met 96.1 percent of their 1944 procurement objective.<sup>43</sup>

This impressive record was achieved with an administrative organization which gave constant evidence of inefficiency. Disputes over prices and delivery schedules occurred frequently after the reorganization of November 1943, which split responsibility for contracting between divisions and districts. Requests for permission to cross over division boundaries in search of production fa-

cilities became common. Procedures and practices varied from one division to another. On 1 September 1944 the Engineers reorganized once again in an effort to relieve the procurement program of these burdens. This time territorial boundaries were erased. All major items—over 2,500 in number—were earmarked for commodity purchase by one of the eleven Division Engineers, who were to handle the contracting process from start to finish. District Engineers, acting on appointment as agents of Division Engineers, would take care of production and shipping matters. Potentially each District Engineer had eleven bosses and each Division Engineer forty-four offices to supervise.

The Procurement Division considered the reorganization of September 1944 a forward step. As ASF had predicted almost two years earlier, commodity purchasing proved far superior to procurement on a territorial basis. Another aid to simplification occurred when several Division Engi-

<sup>41</sup> (1) Engr Bd Hist Study, The Conservation of Critical and Strategic Materials in the Development of Engineer Equipment. (2) Engr Bd Hist Study, Water Distribution and Storage. (3) ASP, Sec. 1, 1 Feb 43. (4) Memo, J. I. Horn, Canvas Unit, for C of Management Br, 11 May 45, sub: Rpt on Mr. Horn's Two-Day Fld Trip to NAD, May 2 and 3, 1945. Management Br Proc Div file. (5) Ann Rpt OCE, 1945.

<sup>42</sup> (1) Study cited n. 41 (1). (2) MPR 20—ENG, 31 Dec 45; 31 Mar 45. (3) 1st Ind (basic missing), Exec Asst Sup Div Ohio River Div to Gen Items Br Rqmts Div, 4 Jun 45, sub: Receipt of Incomplete and Unissuable Items of Engr Sup From Proc. Exec Office Proc Div file, Divs and Dists, Misc 1945.

<sup>43</sup> (1) MPR, Sec. 6, 30 Jun 44. (2) Crawford and Cook, *op. cit.* (3) Ltr, ACofEngrs for Mil Sup to Great Lakes Div Engr *et al.*, 16 Jan 45, sub: Mil Sup Status. Exec Office Proc Div file, Proc Policy and Procedures. (4) 1st Ind, 20 Nov 44, on Memo, Dir Sup ASF for CofEngrs, 20 Nov 44, sub: Availability of Engr Supplies and Equip. Storage Br, Read file.



neers asked to be relieved of procurement functions. By the spring of 1945 the organization was operating with six division and thirty district offices. But administration was still far from smooth.<sup>44</sup> Consider the typical case of the District Engineer who reported that his office was required to handle contract modifications in three different ways.<sup>45</sup>

Complaints about the procurement organization were confined to those who had to work with it day in and day out. Not unnaturally higher echelons of the Chief's office concluded that nothing much could be wrong with an organization which month after month reported steadily mounting deliveries of engineer matériel. Such evidence led Keybold to pronounce the organization "truly sound" even as he called attention to numerous areas of confusion and dissatisfaction.<sup>46</sup> Brig. Gen. Rudolph C. Kuldell, who replaced Fowler as Assistant Chief of Engineers for Military Supply in June 1944, was a good deal more reserved in his judgment. "While, of course, we can get results by the present organization and methods," Kuldell wrote in December 1944, "it is impossible to compete in speed and performance with other services who are organized on a nation-wide scale according to a standard, pre-determined organization and who use identical methods and procedures in handling all phases of the procurement program."<sup>47</sup> Yet it was not in the actual purchase of supplies but in carrying out its part in the Supply Control System that the supply organization fell down most seriously.

### *Inefficiency in the Midst of Plenty*

Responsibility for preparing the supply and demand studies required by the Supply

Control System was assigned to the Requirements and Stock Control Branch, J. M. Wright transferring from the smoothly operating CMP group in the Procurement Branch to become its chief. Dawson had gone to the Southwest Pacific in the fall of 1943 and Col. Lyle Rosenberg took his place as chief of the Supply Division. The Office of the Director of Stock Control having been abolished, Rodwell served for a time as head of the Engineer Field Depot Office, replacing Beauchamp who came back to Washington to head the Storage Branch of the Supply Division. Dissolution of the Engineer Field Depot Office itself came early in May 1944. Division Engineers then stepped into the role of immediate supervisors of warehousing operations, following guide lines established by Beauchamp's Storage Branch. Capt. Richard H. Workman accompanied Beauchamp back to Washington to co-ordinate the stock reports received from the field with Wright's Requirements and Stock Control Branch. Preparation of the consolidated stock report was assigned to the Engineer Central Stock Control Agency. CENSTOCK, which was located in St. Louis, Missouri, became the extract point for processing overseas requisitions,

<sup>44</sup> (1) Orgn for Engr Proc. (2) C/L 3271, 30 Aug. 44, sub: Reorientation of Proc Function—Centrally Controlled Items. (3) Memo, C of Proc Div for ACofEngrs Mil Sup, 26 Mar 48, sub: Orgn of CE for Proc of Mil Sup. Exec Office Proc Div file, Orgn CE.

<sup>45</sup> Memo, C of Proc Div for CofEngrs, 8 Mar 45, sub: Contract Modification. Exec Office Proc Div file, Proc Policy and Procedures.

<sup>46</sup> Ltr, CofEngrs to NAD Engr *et al.*, 20 Jan 45, sub: Clarification of Proc Procedures. Exec Office Proc Div file, Divs and Dists, Misc.

<sup>47</sup> Memo, Kuldell for C of Control Br, 23 Dec 44, sub: Standardization Method of Proc. Exec Office Proc Div file, Proc Policy and Procedures.

taking over this function also from the Granite City Depot.<sup>48</sup>

In March 1944 OCE directed the depots to reset stock levels, allowing a 45-day supply for zone of the interior and a 60-day supply for overseas issues plus a 30-day in-transit time. Reserves would be stocked in amounts equal to one half the level established for overseas issue. The depots were expected to use past issues as a guide in arriving at final estimates, but were instructed to examine other sources such as projected troop strengths for the area or theater served. The Inventory Control Section of Wright's Requirements and Stock Control Branch would review the levels, which would be changed as experience indicated. Three Regional Control Offices (Western, Southern, and Northeastern) were assigned responsibility for the replenishment of stocks up to established levels. Distribution and filler depots forwarded replenishment requisitions to the appropriate Regional Control Office which ordered transfers from reserve stocks within the region, procured noncontrolled items locally, or, in the case of controlled items, forwarded the requisition to OCE.

Life under the new dispensation was extremely hard for the Engineers. Fowler's January 1944 call for immediate improvement, despite close follow-up by the Engineer Field Depot Office, did not bring forth the desired reform.<sup>49</sup> The following comments are typical of what was being said about depot operations months later:

The inspections revealed a marked deficiency . . . in the matter of accurate stock location records and location procedure.<sup>50</sup>

The book inventory at this depot appears to be in a bad condition. Warehouse refusals on general engineer equipment have averaged 50 per day for the first 20 days of the month.<sup>51</sup>

There is an absence of a training program

for electric accounting machine operators. . . . It was noted that there had been inadequate follow-up . . . concerning proper methods of reporting issues, specifically in the transfer of issue balances to key depots and the elimination of extraneous issue balances for non-standard items.<sup>52</sup>

Statistical reports revealed other signs of weakness. At the end of September seven depots reported between 11 and 19 percent of their requisitions unprocessed for reasons presumably within their control. Additional requisitions had been held up because of failure to receive transportation releases or because items were out of stock. Extracts were running between 9 and 32 percent of shipping work loads, owing largely, the depots claimed, to insufficient stocks. There had been a large increase in shipments immediately after D Day. (See *Chart 10*.) All the services found themselves short of stocks in July and August. But Beauchamp suspected that success as measured by overseas shipments was not the sole cause of

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<sup>48</sup> (1) Orgn Chart Sup Div, 10 May 44. (2) C/L 2981, 28 Apr 44, sub: Transmission of Tri-Wkly Stock Balance Rpts on Critical Items to Engr CENSTOCK. (3) C/L 3032, 19 May 44, sub: Transfer of Responsibility of Dir Stock Control.

Strictly speaking, Dawson had never been chief of the Supply Division, but the Supply Division at this time was the equivalent of the old Requirements, Storage and Issue Branch. See above, pp. 94, 532.

<sup>49</sup> (1) C/L 2800, 26 Feb 44, sub: Engr Trp Sup. (2) C/L 2888, 23 Mar 44, Same sub. (3) Memo, C of EFDO for C of Sup Div, 23 Feb 44, sub: Summary Rpt on Inspec Made as a Result of Sup Div Ltr 111. Opns Sec Storage Br file, Lt. Seaton.

<sup>50</sup> 1st Ind, C of Storage Br to NAD Engr, 4 Sep 44 (basic missing). Storage Br, Read file.

<sup>51</sup> Memo, C of Procedures Sec Storage Br for C of Storage Br, 29 Sep 44, sub: Visit, Granite City Engr Depot. Storage Br, Read file.

<sup>52</sup> Ltr, AC of Storage Br to Pacific Div Engr, 20 Oct 44, sub: Rpt of Visit of Capt R. H. Workman to Depots of Pacific Div. Storage Br, Read file.

failure to measure up to established standards of efficiency. Stocks would not have been so low, Beauchamp believed, unless the depots had been laggard in submitting replenishment requisitions or unless some responsible agency had neglected to fill them.<sup>53</sup>

Late in November ASF's Distribution Branch noted that for the past several months Engineer depots had been able to furnish only about 75 percent of items on initial requisitions. ASF granted that this fact was no proof that troops were suffering for want of engineer equipment. Diversion of requisitions to other supply points might have assured the timely flow of supplies. ASF did contend that the high percentage of depot refusals proved that "stock control has not been made effective to the extent which will generally preclude unwarranted rehandling of requisitions with the consequent loss of time and efficiency."<sup>54</sup> The Engineers called for another look at the figures, claiming that the total picture was being distorted because of the admittedly "acute problem" of procurement of spare parts. More than 83 percent of general items of equipment had been supplied by the original source in October. The trend of availability for this group had been steadily upward for the last five months.<sup>55</sup>

The Corps was also quick to take umbrage at ASF's judgment that the "general performance" of the Engineer supply organization "has not been on a par with that attained by a majority of the other Services." Let ASF compare the Engineers' work load with that of the others, Kuldell protested on 18 October. Procurement records showed that Engineer deliveries were 55 percent greater in the third quarter of 1944 than in the first quarter of 1943 as compared with a 10 percent increase experienced by all the

services combined. Let ASF consider the increase in total tonnage shipped by the Corps—367 percent more in the third quarter of 1944 than in the first quarter of 1943. Finally, let ASF note that no theater had reported serious shortages of engineer equipment. Kuldell did not voice Beauchamp's suspicions that failure to reorder might account for the widespread out-of-stock position reported. Rather Kuldell argued that since Engineer procurement deliveries had increased five and a half times more than the average and since stocks in Engineer depots were low, it should be concluded that the demand for engineer supplies was five and a half times greater than that for supplies in general. "Had the increase in demand for engineer equipment been only equal to the other Services and the Procurement remained the same," he asserted, "the Corps of Engineers' depots would have been fully stocked with all items late in the year of 1943 and Supply performance would have been simple, quick and flawless."<sup>56</sup>

Unquestionably the Engineer work load—whether measured by procurement deliveries or tonnages shipped—increased by a greater amount percentagewise than that of the services as a whole from the first quarter of 1943 through the third quarter of 1944. Reference to statistical reports compiled after the end of the war and presumably more accurate than those used by Kul-

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<sup>53</sup> (1) Memo, C of Storage Br for C of Plans and Analysis Sec, 18 Oct 44, sub: Analysis of Sup Opns Rpt, Form 814. Opns Sec Storage Br file. (2) ASF Stat Review.

<sup>54</sup> Memo, Dir Sup ASF for CofEngrs, 20 Nov 44, sub: Availability of Engr Sup and Equip. Storage Br, Read file.

<sup>55</sup> Ist Ind, 27 Nov 44, on memo cited n. 54.

<sup>56</sup> Memo, ACofEngrs Mil Sup for Dir Sup ASF, 18 Oct 44, sub: Analysis of Distr System Employed by CE. 400, Pt. 2.

dell reveals indeed that the increase in Engineer deliveries was 61.5 percent rather than the 55 percent cited by him in October 1944, and this was against an over-all increase of only 11.9 percent. Although the increase in tonnages shipped by the Engineers during the same period appears to have been somewhat less than Kuldell claimed, it was still substantial, 268 percent. The corresponding increase in tonnages shipped by all services was but 84.5 percent. It must be remembered, however, that the Engineer procurement program did not pick up momentum until the second quarter of 1943. Taking this quarter as a starting point, Engineer deliveries show an increase of 31.3 percent through the third quarter of 1944. But all services showed an increase of only 7.0 percent during this time. By the fourth quarter of 1943 the disparity between the Engineer experience and that of the other services began to narrow; in fact, if shipment by line items rather than by tonnage is taken as a measurement during this period, the Engineer increase was less than the average, as indicated below:

	Procurement Deliveries		Tonnages Shipped		Line Items Shipped	
	Engi-neers	All Services	Engi-neers	All Services	Engi-neers	All Services
1st Q 1943	61.5	11.9	268	84.5	(*)	(*)
3d Q 1944						
2d Q 1943	31.3	7.0	106	41.6	(*)	(*)
3d Q 1944						
3d Q 1943	24.4	1.2	79.6	33.3	(*)	(*)
3d Q 1944						
4th Q 1943	5.7	-3.3	41.9	48.9	18.3	28.4
3d Q 1944						
1st Q 1944	12.0	2.6	38.8	35.8	8.3	21.2
3d Q 1944						

\* Not available.

Kuldell admitted that the performance of Engineer depots had been substandard in shipments on initial requisitions. Low stocks were one cause of this. The other—and this was confessing a good deal—was stock misplaced. He claimed, however, that CEN-STOCK had been able in almost all cases to locate the needed items somewhere. The record on second extracts was 95 percent. Final delivery was well over 95 percent because some supplies were still being shipped direct from factory to port. A 95 percent record on second extract could hardly have impressed ASF which had set the standard at 95 percent on first extract.<sup>57</sup>

When Kuldell referred to misplacement of stocks in partial explanation of the poor record made by the depots in filling initial requisitions, he was referring to a condition that had, as well, an adverse effect upon keeping accurate stock records and consequently upon the preparation of the supply control sheets which were the stuff from which requirements were now being computed under the Supply Control System. Time and again the depots were told that accounts must correspond to what was physically available for distribution. But records continued to show stocks that were misplaced and therefore for all practical purposes did not count.

The rules of the names and numbers game were being violated in all echelons of supply despite general improvement in catalogs. As revised in February 1944 to conform to the presentation prescribed by ASF, the Engineer standard catalog consisted of eleven parts, six on general items and five on spare parts. In addition the

<sup>57</sup> (1) *Ibid.* (2) Ltr, C of Rqmts and Stock Control Div to NAD Engr, 15 Dec 44, sub: Short Rpts as an Indication of Out-of-Stock Condition. Exec Office Rqmts Div, Read file.

Engineers published in June a handbook commonly called the "Pink Book." Issued bimonthly, the Pink Book listed the approximately 10,000 standard items of Class II and Class IV supplies. The Pink Book listed the office responsible for procurement of each item, its procurement status, the region or depot responsible for storing it, cross-referenced substitutions, and in other ways provided a ready reference for untangling the maze of functions and the offices which performed them. But the various catalogs and lists were never brought into complete conformity. At all times some group somewhere along the line lacked current information on changes. Depots had been told to use the Pink Book in making up stock reports. But CENSTOCK, the agency which had to work with the reports, was nearly always a step ahead of the current edition of the Pink Book. Procurement officials were particularly remiss about entering the correct name and number on documents forwarded to depots. They had their minds on other matters. In October, Workman reported from the Storage Branch that an on-hand quantity of almost 34,000,000 for 2,052 items from bolts to tractors had been omitted from the Consolidated Stock Report because of various discrepancies in identification.<sup>58</sup>

In view of the well-known inaccuracies in the basic data, persons like Workman and Wright could not have been greatly surprised when the chief of the Requirements Branch, ASF, pronounced the supply control sheets prepared by the Corps of Engineers "the worst of all the Services." But officially the Corps fought back. In relation to volume of procurement, the Corps was required to produce many more sheets than the services to which it had been unfavorably compared: Ordnance, with procure-

ment for November valued at \$981,452,000, produced 413 sheets; Quartermaster, with procurement at \$572,138,000, produced 315. The Corps of Engineers produced 409 sheets on procurement valued at \$201,515,000.<sup>59</sup> The job was formidable:

Preparation of the sheets requires availability of data as to past production, future production schedules and issues as of the end of that month. Much of these data must come from depots and procuring districts in the field, and experience has shown . . . the information cannot be made available in OCE until at least the sixth of the month. Through working many hours of overtime and diverting to the task numerous employees from other units . . . it has been possible . . . to deliver the . . . sheets on the 11th of the month. The speed required is so great, however, as to put out of the question any except the most routine checking. . . . Subsequent to the delivery of sheets, this office must compile within 72 hours and 144 hours, respectively, the exhaustive dollar volume summary tabulations. . . . Upon the receipt of the published MPR-20 ENG, usually about the 15th of the month, copies are studied for about two days by all interested divisions of O. C. E. Thereafter informal conferences are held . . . at which . . . it is *for the first time* possible to form . . . considered recommendations as to . . . particular items of supply. . . . Decisions thus reached are . . .

<sup>58</sup> (1) Engr Sup Procedures, Mar 45. (2) Memo, Dir Mil Sup for OCE Suggestion Comm, 23 Jun 45, sub: Suggestion 183. Exec Office Rqmts Div, Read file. (3) Ann Rpt OCE, 1945. (4) Memo, AC of Storage Br for ACofEngrs Mil Sup, 13 Jan 45, sub: Control Br Survey of Engr CENSTOCK. Storage Br, Read file. (5) Ltr, C of Rqmts and Stock Control Div to NAD Engr, 16 Jan 45, sub: Changes in Stock Nos. Exec Office Rqmts Div, Read file. (6) Memo, C of Stock Accounting Sec Storage Br for ACofEngrs for Mil Sup, 11 Nov 44, sub: Relation of Uniform Stock Identification to Performance of Engr Sup. Exec Office and Coord Sec Rqmts Div, Read file.

<sup>59</sup> Memo, ACofEngrs for Mil Sup for Dir Rqmts Div, 19 Dec 44, sub: Sup Control Sheets. 400, Pt. 2.

submitted on the 21st of the month. Following its combination with the agenda submissions of interested ASF divisions, decisions as to procurement action are taken at the agenda meeting [ASF] on the 27th and 28th of the month. Following receipt of approval of these decisions . . . they must be implemented by the issue of . . . procurement requisitions. Before the completion of the requisitioning process, the sixth of the following month, bringing with it the new compilation of supply control sheets, is usually at hand.<sup>60</sup>

The Supply Control System was unpopular within the Procurement Division, its chief, Colonel Sherrill, protesting what he termed procurement on a "30-day stop and go basis." "I am not unmindful of the fact that the conduct of the war and its progress has a material bearing on what is needed at any given moment," he told Kuldell. "Nevertheless, it seems to me to be bordering on the fantastic to say on 31 December that we need a definite number of Item X which cannot come to hand for six months and then on 31 January say we need less or more of Item X, still four to six months away." Sherrill favored launching a movement "which will have as its objective the fixing of a policy . . . to take everything within the scope of a given contract which industry can produce, pay full prices up to 'VJ Day' plus six months and to do converting or tapering off during that six months' period."<sup>61</sup> In a more practical vein Kuldell himself admonished ASF that "issue history must be given relatively little weight when firm requirements, such as theater quarterly estimates [for Class IV supplies], large changes in the troop basis, or large International Aid commitments are at hand."<sup>62</sup> Persons on the procurement side were understandably embarrassed at having to call for all-out production one day and cancellation of a contract the next. Had the Engineer supply control sheets been

more accurate, fluctuations in the procurement program would have been neither so frequent nor so violent:<sup>63</sup>

*Required Production 1945*

31 January	-----	\$2, 136, 988, 000
28 February	-----	1, 923, 254, 000
31 March	-----	2, 316, 368, 000
30 April	-----	1, 869, 191, 000
31 May	-----	1, 607, 329, 000
30 June	-----	1, 850, 050, 000
31 July	-----	1, 572, 575, 000
31 August	-----	1, 114, 854, 000

Greater accuracy in statements of requirements might also have precluded the large inventories of supplies held in Engineer depots at the end of the war.

*Spare Parts*

All the troubles which plagued the procurement and supply system, troubles that had their roots in the shortage of steel, of components, of manufacturing capacity, and of experienced officers and civilians, were present to an exaggerated degree in the effort to provide spare parts for engineer equipment. The report of the chief of the Maintenance Section on the status of spare parts supply at the end of 1942 had been generally optimistic. Although promising Fowler no miracles, Smith had expressed faith in the soundness of the Engineer maintenance system. He was encouraged by signs that the Procurement Branch

<sup>60</sup> Memo, CofEngrs for Dir Plans and Opns ASF, 15 Dec 44 sub: Sup Control Rpt MPR—20 ENG. Exec Office and Coord Sec, Read file.

<sup>61</sup> Memo, C of Proc Div for ACofEngrs Mil Sup, 29 Jan 45, sub: Term and Cutbacks. Exec Office Proc Div file, Cancellations, Cutbacks, and Term.

<sup>62</sup> 1st Ind, 8 Feb 45, on Memo, Dir Plans and Opns ASF for C of Rqmts and Stock Control Div, 17 Jan 45, sub: Results of Sup Control Action Conf. Exec Office Proc Div file, MPR—20 ENG, Sup Control.

<sup>63</sup> (1) MPR—22 G, 31 Jan 45, 31 Mar 45—31 Aug 45. (2) MPR—22 GX, 28 Feb 45.



STACKS OF ENGINEER SUPPLIES *at a depot in Luzon at the end of the war.*

was going to buy fewer different makes and models. He was hopeful that with production in full swing a better balance could be struck between the delivery of end items and of spare parts. He had been convinced, moreover, that certain administrative changes scheduled to go into effect early in 1943 would prove beneficial.

Basic to these forthcoming administrative changes was the decision to concentrate the storage of spare parts in the Engineer Section of the Quartermaster Depot at Columbus, Ohio. Ideally, spare parts, like general items of equipment, should have been stored in several locations, close to the ports of embarkation and near the training camps. But dispersion of the relatively small store of parts would have resulted in a multiplica-

tion of depot refusals, extracts, and transporting back and forth. Under the circumstances, central storage promised speedier operations. The Columbus depot appeared particularly suitable because it was located in the heart of the construction machinery industry—close to suppliers if distant from most of the installations to be supplied.<sup>64</sup>

<sup>64</sup> (1) Unless otherwise noted, this section is based upon correspondence in 400, Pt. 2; 460, Pt. 1, and Exec Office Proc Div file, Engr Equip Spare Parts. (2) See above, p. 214. (3) Route Slip, Dawson, 10 Nov 42. Intl Div file, Defense Aid 451.31, 23 Apr 40–13 Mar 42. (4) Memo, Fowler for All Concerned, 11 Nov 42, sub: Spare Parts for Defense Aid. Same file. (5) Route Slip, Smith to Molnar, 12 Nov 42. Same file. (6) Interv, Brig Gen C. Rodney Smith, 25 May 55.

About 5 percent of spare parts was stored at Ogden, Utah (searchlights), and Granite City, Illinois (nonstandard tractors, cranes, and shovels).



The decision to store all spare parts at the Columbus depot coincided with SOS' pressure to transfer as many activities as possible out of Washington. In January 1943, Smith's section, its name changed to the Engineer Field Maintenance Office though it was still part of the Requirements, Storage and Issue Branch, OCE, moved into an office in downtown Columbus. The move presaged no change of function. The Engineer Field Maintenance Office remained the agency for the determination of requirements and the initiation of procurement requisitions for spare parts and maintenance equipment for mobile and fixed shops, the preparation of parts catalogs and maintenance manuals, and field supervision over depot and unit maintenance activities. The move to Columbus offered the advantage of closer contact with the Spare Parts Branch of the Engineer Supply Section of the depot, which prepared the first, second, third, and fourth echelon lists of spare parts that served as a primary source of procurement requisitions in much the same way as the T/BA served for general items.<sup>65</sup>

In devising the original lists of spare parts, Colonel Harrison and his staff of civilian technicians in the Spare Parts Branch had to rely almost entirely upon their civilian experience. They could predict quite accurately the life expectancy of a particular part under peacetime conditions. What they could not predict was the kind and amount of usage the machines would be subjected to in the theaters or the frequency and efficiency of resupply. The plan was to revise the lists as such information became available from overseas. Under the policy in effect at the beginning of 1943, fourth echelon spare parts sets (stocked in overseas

depots run by Engineer spare parts supply companies for issue to lower maintenance echelons) were replenished automatically every six months. Such a policy, Smith and Harrison realized, should not continue indefinitely because some parts would, for one reason or another, turn out to have a low rate of demand, and surpluses would result. In February 1943, Smith proposed a change. There would be one automatic issue of a twelve months' supply. Further replenishment was to be made on the basis of need as set forth in requisitions from the theaters. On 22 March, the War Department placed Smith's recommendations in effect.<sup>66</sup>

During 1942 spare parts procurement lists had not only been furnished to the procurement districts but had also been used to a large extent by the Spare Parts Branch itself, for during that year the branch had done a great deal of purchasing direct from suppliers. Production problems had then been so serious that Smith feared the procurement districts would neglect spare parts. Procurement direct from Columbus counterbalanced this tendency. All things being equal, however, it made for efficiency and ease of supervisory control if procurement of spare parts was done by the same office that was purchasing the end item. By the beginning of 1943, with deliveries of engineer equipment more nearly on schedule, less risk was involved in allowing the regu-

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<sup>65</sup> (1) GO 53, 29 Dec 42. (2) Memo, Smith for All Concerned, 5 Jan 43, sub: Transfer of Engr Maint Sec to Columbus, Ohio. Exec Office Proc Div file, Adm Interoff Memos.

<sup>66</sup> (1) *Investigation of the National Defense Program, Hearings*, Pt. 26, pp. 11712, 11729-30. (2) Ltr, Fowler to CG ASF, 19 Feb 43, sub: Sup of Spare Parts for Engr Equip. 475, Engr Equip, Pt. 1. (3) WD Memo W700-15-43, 22 Mar 43, sub: Sup and Proc of Spare Parts for Engr Equip. (4) Interv, Gen Smith, 25 May 55.



lar procurement organization to take over all of this work. The Columbus Spare Parts Branch then began to bow out of procurement. A directive issued on 8 December 1942 made it incumbent upon the procurement districts to see to it that spare parts were an integral part of every contract. The Spare Parts Branch was to furnish the procurement district with the requisite spare parts lists within ten days of receipt of notification of the impending negotiation of a contract.<sup>67</sup>

Although the Spare Parts Branch did not immediately achieve this goal, by spring 1943 the procurement districts were receiving the lists in plenty of time to carry out their part of the job, and the spare parts sections of supply catalogs were either published or well on the way toward publication. Changes were constant, however. The Spare Parts Branch was attempting to cover items that had been procured previously without spare parts and to avoid ordering parts for which stocks on hand or due were sufficient. Quantities varied therefore with the negotiation of each contract. So, in many cases, did types. The shortage of materials, of engines, and of other vital components made it impossible for procurement offices to insist that manufacturers adhere to the list of Standard Components of Standard Makes and Models that had been published in the fall of 1942. The changeover to Chrysler engines brought about the most far-reaching modification as to types, but throughout the war manufacturers were forced to make use of whatever happened to be available. Substitutions of one material for another, although properly encouraged because of the same long-run advantages that were present in the switch to automotive engines, added to the complexity of the

maintenance program and increased the work load of maintenance troops the world over.<sup>68</sup>

In the face of such changes, a "standard" model delivered in 1943 might differ considerably from one purchased a year later. And even within the limits of this broad definition of "standard," the Corps never arrived at the point of ordering standard makes and models to the exclusion of all others. The general scarcity of production facilities encouraged such lapses on the part of the procurement organization. Perhaps a factor of greater importance in the later years of the war was the persistence of Engineer theater commands in what the maintenance organization could not fail to regard as sinful ways. Although inclusion of Class IV items in supply catalogs served to cut down requisitions for nonstandard equipment, the practice never entirely ceased. In April 1944, at the time the new Class IV catalogs were distributed, about 32 percent of the requisitions received from Pacific theaters (including those for spare parts) and about 25 percent from Europe were for nonstandard items.<sup>69</sup>

<sup>67</sup> (1) Interv cited n. 66(4). (2) See above, pp. 212-13.

<sup>68</sup> (1) Memo, Maj Walter S. Shoffstall for Seybold, 3 Apr 43, sub: Average Time for Securing Spare Parts Lists, with Incl. Personal file, M. S. Denman, Proc of Spare Parts. (2) Memo, Maj Gen LeRoy Lutes, ACofS for Opns SOS, for CofEngrs, 9 Mar 43, sub: Rpt on Columbus QM Depot, Jointly Occupied, Engr Sup Sec, with Incl, 5 Mar 43. 400.242, Columbus Gen Depot.

<sup>69</sup> (1) Memo, Fowler for ACofEngrs for War Plans, 17 Mar 44, sub: Use of Standard Engr Equip. Exec Office Rqmts Div, Read file (S). (2) Memo, ExO Sup Div for C of Sup Div, 28 Apr 44, sub: Rpt on San Francisco Fld Liaison Office. Exec Office Rqmts Div, Read file. (3) Draft Ltr, Kuldell, ACofEngrs for Mil Sup, to CG ASF, 16 Apr 45, sub: Requisitioning of Engr Sup and Equip. Exec Office Proc Div file, MPR 20—Engr Sup Control.

## STORAGE SPACE AT COLUMBUS ASF DEPOT

<i>Service</i>	<i>Total</i>	<i>Warehouse</i>	<i>Shed</i>	<i>Open</i>
Engineers.....	4, 519, 940	1, 335, 290	319, 050	2, 865, 600
Quartermaster.....	2, 388, 304	2, 197, 304	.....	191, 000
Ordnance.....	3, 806, 494	1, 138, 814	867, 680	1, 800, 000
Medical.....	294, 463	294, 463	.....	.....

The Engineers had committed themselves to keep completely in repair only the approximately 10,000 standard types. For the rest they planned to supply only 1st echelon repair sets or at the most very small quantities of depot stocks. Columbus was said to stock about 200,000 different parts.<sup>70</sup> Actually this figure included many parts that were identical but were carried on the records as unique because of the practice of matching parts to particular machines. The Engineers knew that parts common to several machines should be assigned Federal Catalog numbers and stored together, but since experts were required to do this time-consuming work, most parts were identifiable only by manufacturers' numbers, which were themselves unstable.<sup>71</sup>

In the face of a shortage of certain key components, procurement of spare parts amounted to considerably more than seeing to it that they were covered in the contract. For what were spare parts if not components? Since in many cases a choice had to be made, procurement officers, being human, tended to push the delivery of end items. Spare parts possessed no glamor and promised little glory. Only end items appeared on the Monthly Progress Reports.<sup>72</sup>

Smith's hope—expressed to Fowler at their showdown conference in December 1942—that spare parts supply would emerge from the "critical" stage in the next few months, failed to materialize. Factors already mentioned—the continued purchase of nonstandard equipment, lags in deliveries

of many spare parts themselves—contributed to a generally unsatisfactory state of affairs at Columbus depot. Unfortunately, additional evils were generated within the depot itself.

Many of the difficulties that arose at Columbus stemmed from the physical setup. As in similar installations, storage facilities assigned to the technical services by the Quartermaster officer in command consisted of warehouses, sheds, and open areas. Although in January 1943 the Corps of Engineers occupied more space in the depot than any of the other three services involved, over half of its allotted area was uncovered. Storage of spare parts took up comparatively little of the Engineer allotment—less than 300,000 square feet in one warehouse and five sheds. Spare parts was but one of the many things that the inexperienced Engineer supply officer, Col. David L. Neuman, had to think about in January 1943. But spare parts forced themselves more and more to his attention, for it was not long before the storage and issue of spare parts

<sup>70</sup> As used here and below, "Columbus" and "the depot" stand for the Engineer Section of the Columbus ASF Depot.

<sup>71</sup> (1) Engr Sup Procedures, Mar 45, p. 1. (2) Engr Catalog, Pt. III, Sec. CE-15. (3) *Investigation of the National Defense Program, Hearings*, pp. 11692-93, 11717-18. (4) Memo, Lt Col J. J. Winn, Jr., Exec Office Rqmts and Stock Control Div for ExO Mil Sup, 29 Jan 45, sub: Rpt on Spare Parts Gen Situation. Exec Office Rqmts Div, Read file.

<sup>72</sup> Ltr, Rosenberg to CG ASF, 12 Jun 43, sub: Schedule of Spare Parts Shipped Concurrently with End Items. Exec Office Proc Div file, ASF.

dominated Engineer operations at Columbus.<sup>73</sup>

Despite the fact that deliveries of spare parts were running seriously behind schedule, the growth of business done at Columbus was, according to Smith, the man who should have shown least surprise, "almost unbelievable."<sup>74</sup> Smith's figures showed that from September 1942 through February 1943 the monthly volume of spare parts increased from 3,056,126 to 15,000,000 pounds. Work was carried on in cramped quarters. Not only was there insufficient over-all space, but in the opinion of Beauchamp of the Engineer Field Depot Office, Neuman and his staff had not made the most of what space was available. Estimates of the number of bins required for storage had been based upon the dollar value of parts under order, a most imprecise means of figuring how many bins to construct. The idea was to store items by manufacturer and by size, but there were so few empty bins that constant shifting was necessary. Lack of bins was causing serious delays in putting away parts, a process that averaged about three weeks from railside to bin in the spring of 1943.

In records keeping also, Columbus got off to a poor start. In February 1943 the depot was stocking parts from over 300 manufacturers for a total of 782 different machines. Only seven suppliers had been picked up on the IBM system. Although the parts furnished by these seven constituted about half the work load, Smith predicted it would take months to finish the conversion from manual to machine bookkeeping, even with the additional clerks and machines that Neuman had by this time succeeded in rounding up.

At Columbus, as elsewhere, it was difficult to hire and keep competent clerks and

sturdy, dependable laborers. Engineer depot companies and spare parts supply companies assigned to the depot for training proved a boon. But the labor problem was never completely solved. In March 1943 Columbus employed 4,688 civilians, almost twice as many as Granite City, the depot having the next largest number of employees. Firm supervision of such a large force was essential. The Engineer Supply Section had a staff of 75 officers, 57 on regular assignment and 18 from the replacement pool, many of them green. Perhaps because experience was so lacking, Neuman delegated little responsibility to his subordinates.<sup>75</sup>

On 1 May 1943, an incredulous Dawson telephoned Smith about an urgent shipment of spare parts:

*Dawson:* They tell me that it'll take the Depot thirty to sixty days to get them out . . . .

*Smith:* Well, the average time now is about 30 days. . . .

*Dawson:* That's terrible.

*Smith:* I know it. . . . The chief reason is lack of parts. All the back orders, the fact that availability has to be determined, back orders set-up, stuff packed without complete shipments.<sup>76</sup>

<sup>73</sup> (1) Figures for the Engineers include space at two subdepots. Memo, C of Depot Sec for C of Rqmts, Storage and Issue Br, 26 Jan 43, sub: Rpt on Columbus QM Depot. Storage Br, Read file. (2) Ltr, Neuman to Rqmts Br, 30 Jan 43, sub: Reply to Info Questionnaire Dated 16 Jan 43. 323.3, Columbus Gen Depot.

<sup>74</sup> Ltr, Smith to Rqmts Br, 11 Mar 43, sub: Study of Spare Parts Br at Columbus. 400, Pt. 2.

<sup>75</sup> (1) Memo, Dawson for O&T, 22 May 43, sub: Asgmt of Depot Cos to Engr Depots and Engr Secs of ASF Depots. Storage Br, Read file. (2) Memo, Dawson for C of Mil Pers Br, 16 Jun 43, sub: Asgmt of Offs. 210.01. (3) Incl, 20 Mar 43, with Ltr, Mil Pers Br to CG SOS. 290, Manpower. (4) Ltr, Col D. G. White, Actg C of Fld Sv Sup Div, 5 Nov 43, sub: Tng of Depot Cos and Parts Sup Cos. 353, Columbus Gen Depot. (5) *Investigation of National Defense Program, Hearings*, pp. 11697-701.

<sup>76</sup> Tel Conv, Dawson and Smith, 1 May 43. 400.333, Pt. 1.



CONVERTING STOCK RECORDS OF PARTS *from manual to machine book-keeping, Columbus, Ohio, October 1943.*

Although Smith laid the main cause for inefficiency at the door of procurement, he and everyone who had anything to do with the Columbus depot agreed that more space was desperately needed. On 29 April, Dawson entered a formal request for construction of another warehouse, which was promptly authorized. Although this expansion proved insufficient, it was nevertheless the last one. A brake had been applied to new construction. Other means for providing more space would have to be found. Neuman, strongly supported by Smith, had been advocating other means in addition to new construction for some months. His efforts had led to the transfer elsewhere of various activities, among them an officers' supply school. He had shifted

quantities of spare tires to the depot at Marion, Ohio. He had recommended further diversion of general engineering stocks. In mid-July 1943, Dawson directed the gradual removal of all general items from Columbus, the shift to be accomplished in 30 to 90 days. It seemed logical and economical to make the transition gradually. Instead of a sudden emptying of the warehouses with all the paper work and transportation involved therein, Columbus would simply continue to fill requisitions for general items for a time. As fast as the general items moved out, spare parts would move in. It took the full 90 days to "complete" the removal of general items from Columbus, and as late as March 1945, 100,000 square feet of warehouse space was still oc-

cupied by some of this equipment. The piecemeal acquisition of space necessitated much more moving about of spare parts than if clearance had been effected at one time. Neuman needed elbow room. Unpredictable expansion made an over-all plan for orderly storage impossible.<sup>77</sup>

In June 1943, the Supply Division increased the tempo of its attack on what Smith considered the root of the problem, namely, the lagging procurement program. Interest was whipped up by the announcement of a drive on the part of Columbus for the shipment of 6,000,000 pounds of spare parts that month with a steady increase monthly to 10,000,000 pounds in October. The June drive was successful. Receipts at the depot were the highest on record and the goal of shipping 6,000,000 pounds of spare parts was met. By fall Neuman claimed substantial progress. The IBM system was almost wholly installed. Thousands of bins were being constructed and rearrangement of stocks was under way. Shipments, although short of the goals announced in June, had increased steadily to more than 8,000,000 pounds in September. The depot presented quite a different picture to the officer from The Inspector General's Office. He noted a backlog of 10,000 requisitions amounting to 20,000,000 pounds in shipments while 8,000,000 pounds of parts awaited unpacking and storage. Stocks appeared seriously out of balance. Orders representing 2,400 different Caterpillar tractor parts remained unfilled because these items were not on hand, but the depot contained \$500,000 worth of cabs, chassis, and other heavy units for which practically no demand existed.<sup>78</sup>

On 15 October, Col. Roy D. Burdick replaced Neuman at Columbus. Burdick had been in charge of the Engineer Section of

the Utah Quartermaster Depot for the past year. Otherwise he had had no experience in supply. ASF, conducting an investigation of its own shortly after his arrival, left with the understanding that the backlog would be cleared up in about four months. Naturally, the burden of responsibility did not fall solely upon Burdick. Production of certain spare parts—for tractors, graders, shovels, engines, and chain saws—had to be increased. According to Smith, however, the depot contained two thirds of the parts involved in the backlog. His answer was more labor. To Beauchamp success hinged on an all-out effort to rearrange the stocks, followed by a complete physical inventory. His investigators discovered some parts in as many as thirty different places. No wonder it was difficult to keep up with what was on hand. Cross-referencing of interchangeable

<sup>77</sup> (1) Ltr, Dawson to Col Albert B. Drake, Dir Storage Div ASF, 29 Apr 43, sub: Additional Warehouse Space Columbus QM Depot, with 2d Ind, Gen Wood, Dir Rqmts Div ASF, to CofEngrs, 8 May 43. 400.242, Columbus Gen Depot. (2) Ltr, Dawson to Engr Sup Off Col ASF Depot, 18 Jul 43, sub: Transfer of Engr Br Columbus ASF Depot. Same file. (3) Ltr, Rosenberg to Ohio River Div Engr, 12 Jan 44, sub: Spare Parts Activities of Engr Sec Columbus ASF Depot. 323.3, Columbus Gen Depot. (4) Ltr, Col Thomas B. Morris, C of Sup Div Ohio River Div to CofEngrs, 22 Mar 45, sub: Gen Engr Stock Engr Sec Columbus ASF Depot. Storage Br, Read file. (5) *Investigation of National Defense Program, Hearings*, pp. 11666, 11674–75. (6) Comments, Smith for EHD, 16 Apr 56.

<sup>78</sup> (1) Ltr, Rosenberg to NAD Engr *et al.*, 2 Jun 43, sub: Delivery of Spare Parts. Exec Off Proc Div file, Divs or Dists, Misc to All. (2) Ltr, Withers, Actg C of Proc Sv, to Great Lakes Div Engr *et al.*, 3 Jul 43, sub: Delivery of Spare Parts. Same file. (3) Ltr, Neuman to Fowler, 4 Oct 43, sub: Rpt on Plans of Engr Sup Off of Engr Sec Columbus ASF Depot. 323.3, Columbus Gen Depot. (4) Ltr, Lt Col Allen G. Raynor, Office of IG to TIG, 23 Sep 43, sub: Special Inspec of Spare Parts Br and Maint Unit Repair Activity Engr Sup Sec Columbus ASF Depot. Storage Br file, Spare Parts.

parts, supposed to serve as a stopgap for conversions to federal stock numbers, had fallen behind. So had the revision of spare parts lists and catalogs. Aside from the injection of a noticeable sense of urgency, the diagnoses and remedies of late 1943 bore a striking resemblance to those advanced earlier. By the beginning of 1944, however, the drive to get the situation in hand had produced a new theory as to the cause for the disorder.<sup>79</sup>

As pressure was exerted to step up procurement of spare parts and as Columbus fell further and further behind in shipments, the Supply Division for the first time challenged the requirements as set forth in Smith's office. Try as it would, the Spare Parts Branch could not obtain sufficient information from the theaters to keep abreast of the rate of consumption. Statements of requirements, designed to furnish automatically a year's supply of parts, continued to be based upon theoretical assumptions. Fowler and his advisers in the Supply Division believed that certain parts were piling up overseas just as at Columbus and that the procurement, handling, and storage of quantities of these parts diverted materials and labor away from the effort to provide critically needed parts. Reybold, just returned from a tour of the Pacific theaters, asserted that an adequate supply of spare parts had begun to arrive, but were lying around unpacked for lack of trained personnel. While O&T sought authorization for an increase in the numbers of maintenance units, the Supply Division determined to arrive at a more realistic estimate of the types and quantities of spare parts to be supplied.<sup>80</sup>

On 24 February 1944, Fowler announced the first step in a move to eliminate automatic supply to the greatest extent possi-

ble—to rely instead upon the theaters to requisition what they needed. The Maintenance Office was to examine each requisition in the backlog at Columbus and cancel those covering items for which an “appreciable” quantity of parts had already been shipped. The depot would fill the remainder if possible; all that could not be filled would be canceled. To insure against future inflation, Fowler ordered the Maintenance Office to make a 50 percent reduction in the quantities of each item on spare parts lists. A week later the Supply Division instructed Columbus to suspend all back orders three months old or older and to notify the theaters to requisition these items if they still wanted them.<sup>81</sup>

The wholesale cancellations ordered by the Supply Division bespoke a desperate attempt to prevent another crisis at Columbus. The attempt failed. Cancellations, suspensions, and reviews of spare parts lists took time. By mid-April the backlog in automatic shipments had reached 45,000,000 pounds—more than twice the total six months before when Burdick took over. Fifty railroad cars of spare parts bore witness to the slowness with which stocks were being moved into storage. Warehousing was

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<sup>79</sup> (1) *Investigation of National Defense Program, Hearings*, p. 12224. (2) 1st Ind, 12 Nov 43, on Memo, ExO Control Br for C Engineer Field Maintenance Office, 8 Nov 43, sub: ASF Study of Spare Parts. Control Div file, Folder A-Z. (3) Ltr, Beauchamp to Burdick, 20 Dec 43, sub: Examination of Procedures Within Storage Div Engr Sec Columbus ASF Depot. Storage Br file, Fld Sv.

<sup>80</sup> (1) Ltr, Fowler to Engr Sup Officer Columbus ASF Depot, 24 Feb 44, sub: Procedure with Respect to Processing Spare Parts Requisitions. 400.312. (2) Memo, CofEngrs for CG ASF, 2 Feb 44, sub: Provision of Adequate Maint and Parts Sup Orgns in Overseas Theaters. 320.2, Engrs, Corps of (S).

<sup>81</sup> (1) Ltr cited n. 80 (1). (2) C/L 2823, 1 Mar 44, sub: Filling Spare Parts Requisitions and Canceling Back Orders.

still haphazard. Burdick, like Neuman before him, had delegated little authority. Morale was poor. Under what he termed "considerable pressure" to show results, Burdick appealed to his subordinate officers to spend more time working and less time drinking coffee and relaxing with feet on the desk. "Don't just look alive; be alive," he counseled.<sup>82</sup>

The pressure Burdick referred to was from Col. James M. Barclay of the Storage Division, ASF, who had arrived at Columbus with the intention of staying until it began to operate on a current basis. Although Barclay acknowledged the fact, later confirmed by the theaters, that there was a large surplus of heavy parts such as grader blades, he denied that requirements had been grossly inflated. From his observations in North Africa, Sicily, Italy, and England, Barclay concluded that spare parts on hand were sufficient, but only because, with the cross-Channel invasion postponed, the timetable of operations had slowed down.<sup>83</sup> Referring to the backlog in automatic requisitions he declared there was "no question about it that these supplies should have been over there."<sup>84</sup>

Barclay remained at Columbus six weeks, and during this time brought in Lt. Col. Paul H. Startzman and several additional officers with creditable civilian and military supply experience to replace Burdick and his top assistants. Altogether about 25 officers and 400 civilians were removed. Making little change in the form of the organization, Barclay distributed responsibility from top to bottom and inaugurated a training program for the entire staff. With duties thus clarified and with some rearrangement of stocks and improvements in procedures for handling the flow of paper and materials, Barclay expected the depot to reach a

monthly shipping capacity of 20,000,000 pounds by 1 July, about double the volume attained in the past. An all-out effort to put stocks in order was to begin late in July and be finished in six months. The backlog should be cleared by 1 September.

Despite Barclay's acknowledgment that the requisitions on hand when he arrived at Columbus represented a fairly realistic picture of overseas needs, the drive to cancel them was intensified as the only practicable means of getting off to a new start. The month of May saw 700,000 such cancellations, compared with slightly over 100,000 in April and again in June. By the middle of August the backlog had vanished. Operations were current.<sup>85</sup>

The Special Committee Investigating the National Defense Program, which had become interested in Columbus during the depot's most troublous times but which had agreed to postpone its inquiry until ASF instituted its reforms, attributed much of the improvement evident in September to the cancellations. In insisting that an increase in efficiency had been largely responsible, Barclay stated that most of the cancellations had been temporary and that when the theaters confirmed many of the old requisitions with new ones, the new ones were handled expeditiously, in a matter of days. Columbus could now ship 20,000,000 pounds monthly, if need be, and had shipped 13,800,000 pounds in August. So much had in fact been accomplished to speed the flow of spare parts in and out of

<sup>82</sup> Memo, Burdick for All Offs Engr Sec, 17 Apr 44, sub: Deficiencies. *Investigation of National Defense Program, Hearings*, pp. 12213-14.

<sup>83</sup> *Investigation of National Defense Program, Hearings*, pp. 11637, 11644, 11646-48.

<sup>84</sup> *Ibid.*, p. 11647.

<sup>85</sup> (1) *Ibid.*, pp. 11645-46, 11664, 11666, 12215-24, 12227.

the depot that Startzman declared it unnecessary to carry out further rearrangement of stocks. As a result of prompt storage of incoming goods and more accurate stock location records Columbus had gone a long way toward extricating itself from the anomalous position of piling up unfilled orders for stocks physically on hand. Since, however, many items of common hardware remained tied to particular makes and models and since the only action resembling a real inventory had been a one day affair in April 1944, the depot continued to report false shortages.<sup>86</sup>

Analysts attributed some of the steady rise in back orders at Columbus, from 150,000 in September, to 194,000 in October, to 210,000 in December, to these false shortages, the rest to actual lack of stocks of particular parts that had been requisitioned by theaters. The Supply Division's assault upon automatic supply had been successful. This assault had in fact dovetailed perfectly with the change in methods of estimating requirements under the Supply Control System. In March, Smith transferred to ASF headquarters to assist in bringing spare parts for the entire Army under this system and by early June details had been worked out. With some few exceptions, automatic procurement and issue were henceforth limited to first echelon sets. The remainder of the procurement program was to be established after weighing stocks on hand and on order against the trend of demands overseas.<sup>87</sup>

In applying the Supply Control System to spare parts the Engineers faced a far more complicated task than that demanded for principal items. Failure to identify common parts swelled the volume of records to be kept at the same time that it created a false impression of what was on hand and on

order. In the fall of 1944 the drive to consolidate parts numbers began in earnest. The work, although promising, was slow. As of the end of the year, 28,000 parts numbers, a small fraction of the total, had been consolidated into 8,000. Supply and demand studies, the necessary preliminary to procurement programs, had to be made using the old numbers. This work, begun in June 1944 under a manual system, was completed after a change to IBM by the Spare Parts Control Office (successor to the Engineer Field Maintenance Office) at the end of November. Procurement requisitions were then forwarded to the districts. These requisitions did not represent a true statement of requirements because the Spare Parts Control Office had left it to the districts to make adjustments after studying orders already placed. Protesting that the Spare Parts Control Office had sufficient data on hand to make the necessary adjustments, the Procurement Division refused to allow this work to be unloaded on the already overburdened districts. In view of the mounting back orders at Columbus and of Startzman's confident assertion that 20,000 items were in short supply, Sherrill ordered procurement offices to place under contract all requisitions calling for deliveries through the first six months of 1945. Checking against orders already

<sup>86</sup> (1) *Ibid.*, pp. 11644, 11656, 11675-76, 11684-86, 12214. (2) Ltr, Startzman to Ohio River Div Engr, 28 Oct 44, sub: Rev of Opn Plan 2, Columbus ASF Depot. Storage Br file, Lt Col James M. Barclay. (3) Ltr, Maj E. W. Downard and C. E. Keiser, Opns Br Distr Div ASF, to CG ASF, n. d. [c. 31 Jan 45], sub: Obsvn of Stock Control Opns at Engr Sup Sec Columbus ASF Depot. . . . During Period 25-31 Jan 45. 400.291 Columbus Gen Depot, Pt. 3.

<sup>87</sup> (1) *Investigation of National Defense Program, Hearings*, p. 11675. (2) Ltr cited n. 86 (3). (3) WD Cir 227, 7 Jun 44, sub: Spare Parts Rqmts, Proc, and Issues.



placed and necessary cancellations would follow.<sup>88</sup>

Neither this order nor subsequent directives to expedite procurement succeeded in bringing about a balanced stock at Columbus. Deliveries of the so-called fast-moving parts lagged behind if for no other reason than that they were urgently needed as components of end items in great demand. In March 1945, an analysis of approximately one third of the parts carried on the books at Columbus revealed 15 percent out of stock, 12 percent below established levels, 48 percent surplus, and 25 percent between established and surplus levels.<sup>89</sup>

The Engineer task overseas, primarily a task of construction, could not fail to be hampered by the chronic disorders which characterized the effort to furnish spare parts for engineer equipment. In the theaters, moreover, these disorders were aggravated by too few maintenance troops.

In the spring of 1943 Smith had begun to press for more spare parts personnel in all echelons. The measure of his success was AGF's willingness to incorporate parts supply platoons in maintenance and depot companies. Meanwhile OCE urged the War Department to consider the entire maintenance picture. Assuming a coverage of about 200 tractors, air compressors, or similar machinery per company, all 34 maintenance companies in the troop basis plus an additional 5 had to be assigned to support engineer AGF units. In August Gorlinski requested 20 maintenance companies for ASF and estimated that engineer aviation units would require the support of 45 companies. On the assumption that the heavy shop company could provide fourth echelon maintenance for 1,000 items, Gorlinski fixed the ratio of heavy shop companies to maintenance companies at 1:5 and recommended 5 more

heavy shop companies. About a week later, Sturdevant pointed to the deficiencies resulting from division of responsibility for maintenance units among the three major headquarters, each command pleading its own needs to the neglect of the others. This campaign bore some fruit, for the War Department approved an increase of 21 maintenance companies and two heavy shop companies in the October 1943 Troop Basis. At the same time AAF projected the organization of 16 engineer aviation maintenance companies, which seemed to the Air Engineer a fair allotment in view of the reduction of aviation construction units and the self-contained shops in the aviation battalions. Tentative plans for the 1944 Troop Basis called for 10 additional companies for ASF.<sup>90</sup>

In November 1943 the Supply Division, after considering evidence presented by the

<sup>88</sup> (1) See above, pp. 545-46. (2) Teletype, Sherrill to Upper Mississippi Valley Div Engr *et al.*, 30 Nov 44. Exec Office Proc Div, Read file.

<sup>89</sup> (1) Ltr, Kuldell to Great Lakes Div Engr, 11 Dec 44. Exec Office Proc Div file, All Divs 1943-44 Addresses. (2) Ltr, Lt Col Harold U. Andreae, Engr Sup Officer Columbus ASF Depot, to Ohio River Div Engr, 26 Mar 45, sub: Stock Status Engr Sec Columbus ASF Depot, with 1st Ind, 29 Mar 45. 400.291 Columbus Gen Depot, Pt. 3.

<sup>90</sup> (1) Memo, Smith for Asst Engr AGF, 6 May 43, sub: Activation of Parts Sup Plats or Dets. Mob Br file, Parts Sup Co (S). (2) 3d Ind, C of O&T Br to CG ASF, 14 Aug 43, on Memo, Dir Mob Div ASF for CofEngrs, 25 Jun 43, sub: Additional Engr Maint Units for Trp Basis. Mob Br file, Maint Cos (S). (3) Memo, ACofEngrs for CG ASF, 21 Aug 43, sub: Authorization of Engr Sv Units in Trp Basis. Mob Br file, Engr Sv Units (C). (4) 4th Ind, Dir Mob Div ASF to CofEngrs, 14 Oct 43, on Memo, Dir Mob Div ASF for CofEngrs, 25 Jun 43, sub: Additional Maint Units for Trp Basis. Mob Br file, Maint Cos (S). (5) R&R Sheet, Comment 2, Air Engr to AC of Air Staff Opns, Commitments and Rqmts Programs Br to AC of Air Staff MM&D Air Engr, 9 Sep 43, sub: Additional Engr Maint Units in Trp Basis AAF. AAF 321-B, Engr Corps (S).

theaters, estimated that in the Southwest Pacific the engineer maintenance effort was 25 percent adequate; South Pacific, 50 percent; China-Burma-India, 75 percent; North Africa, 25 percent; and United Kingdom, 75 percent. At the same time Gorlinski pointed out that the October 1943 Troop Basis did not include engineer aviation maintenance companies. In all he claimed a shortage of 22 maintenance companies (55 in the troop basis as compared to 77 needed) and a surplus of one heavy shop company (18 in the troop basis). Early in 1944 it seemed to the Engineers that they would obtain sufficient maintenance companies. There was, however, a shortage of parts supply companies and platoons.<sup>91</sup>

After a resurvey of the troop basis, Sturdevant submitted new recommendations in March 1944. Changing the ratio of heavy shop companies from 1:5 to 1:4 and assuming that a parts supply company could serve 30,000 troops and a parts supply platoon 15,000, he recommended that the number of maintenance companies be increased from 72 to 100, heavy shop companies from 20 to 25, parts supply companies from 15 to 19, and parts supply platoons from 13 to 27. By May 1944 the troop basis had provided for 24 heavy shop companies, 19 parts supply companies, and 23 parts supply platoons. However, the maintenance companies, which were an AGF responsibility, remained at 72. AGF refused to act. In June the Engineers informally urged the return of maintenance companies to ASF, but without success.<sup>92</sup>

In urging an increase in the number of maintenance units in February 1944, Reybold had stressed the illogic of furnishing large quantities of construction machinery without providing means for keeping it in operation. Reybold's statement was, of

course, as applicable to spare parts as it was to troops. Failure to supply sufficient men and parts to maintain the construction plant spelled waste and frustration. Waste was, moreover, not simply the product of shortages. Surpluses must also be counted. To cite an extreme but instructive example, in April 1945 the Corps of Engineers found itself with \$4,000,000 worth of rock bits and drill steels to be disposed of. Some of this excess, perhaps three quarters of a million dollars worth, represented international aid stocks, which for one reason or another had not been shipped. But most of the surplus had resulted from gross miscalculation and lack of co-ordination. Bits and drills had been procured both as primary items (on requisitions made up by the Procurement Division) and as spare parts (on requisitions made up by the Maintenance Division). Both offices had set requirements far too high, assuming apparently that hard rock would be encountered whenever engineer construction troops set out to build a road or an airfield.<sup>93</sup> Such miscalculations arose from a desire to err on the safe side, for error was inevitable in a field where experience was so slight. Shortages of spare parts were due not so much to underesti-

<sup>91</sup> (1) Memo, Actg C of Sup Div for CG ASF, 1 Nov 43, sub: Maint. 320.2, Engrs Corps of (S). (2) 5th Ind, C of O&T to CG ASF, 3 Nov 43, on Memo, Dir Mob Div ASF for CofEngrs, 25 Jun 43, sub: Additional Engr Maint Units for Trp Basis. Mob Br file, Maint Cos (S). (3) Memo, Mob and Trp Units Sec Theater Br WPD for C of Theater Br WPD, 15 Jan 44, sub: Study of Engr Maint and Parts Sup Units in TofOps. 400 (S).

<sup>92</sup> (1) Memo, ACoEngrs for CG ASF, 24 Mar 44, sub: Engr Maint and Parts Sup Orgns. 320.2, Engrs Corps of, Pt. 2 (S). (2) Wkly War Plan Staff Conf, 29 May 44, 5 Jun 44.

<sup>93</sup> Memo, Col White, C of Rqmts and Stock Control Div, for C of Redistr and Salvage Br, 23 Apr 45, sub: Excess Stocks of Rock Bits and Drill Steels. Exec Office Rqmts Div, Misc Read file.

mates, although underestimates did occur, as to lags in the procurement program which were in turn part of a larger complex which involved shortages of facilities, raw materials, and components. The realities of this complex removed standardization of makes and models to the plane of a vainly sought ideal. And lack of standardization made for difficulties in warehousing and stock control.

Although the Chief of Engineers could truthfully assert in December 1944 that "in general, the Engineer stock situation as regards spare parts is satisfactory except in the Southwest Pacific and China-Burma-India Theaters where low priorities obtain,"<sup>94</sup> the supply of spare parts was not then nor had it been previously entirely adequate in any theater. Even the high priority European theater experienced persistent shortages of gears and valves, and sometimes of cap-screws, nuts, and washers. The Southwest Pacific especially suffered from grave deficiencies throughout most of the war despite noted improvements beginning late in 1943. At the end of 1944 this theater reported about 2,000 parts in short supply, and pointed out that 30 percent of its machinery was continuously out of order as a result.<sup>95</sup>

The end of the war found the Engineers in possession of large quantities of matériel. A month after the defeat of Germany Kuldell noted that "for the past twelve months the Corps of Engineers has never procured in excess of its approved procurement program, but has nevertheless increased its inventory at an alarming rate

throughout the entire year due to the fact that the theaters did not, or could not, draw out in shipments the total tonnage which had been procured for them and placed in depots for their use, in accordance with computed requirements and estimated projects."<sup>96</sup> Insofar as surpluses can be attributed to circumstances overseas rather than to inefficiency in stock control, the answer in the case of the European theater was "did not." Supplies in the ETO, which held first priority on shipping as well as matériel, were generally plentiful from D Day onward. On the Continent, engineer troops did not encounter the wholesale destruction anticipated. Conversely, they were able to obtain many supplies locally. In the Southwest Pacific, it was a case of "could not." Mainly because of the tremendous distances from the United States to the theater and within the theater itself, nothing like abundance was ever approached in that area. Only after the surrender of Germany did supplies begin to reach MacArthur's engineers in ample quantity.<sup>97</sup>

<sup>94</sup> Memo, CofEngrs for CG ASF, 20 Dec 44, sub: Engr Sup Opns. 400, Pt. 2.

<sup>95</sup> (1) Incl, Problems Connected with Parts Sup in ETO, with Ltr, Maj Gen Cecil R. Moore, C Engr ETO, to Kuldell, 17 Aug 44. Intl Div file, 475, Spare Parts. (2) *Engineers of the Southwest Pacific*, Vol. VII, *Engineer Supply*, pp. 71-73, 132-36, 200-01.

<sup>96</sup> Ltr, Dir Mil Sup to Div Engrs, 18 Jun 45, sub: Mil Sup for May 45. 400, Pt. 3.

<sup>97</sup> (1) Info from historians preparing volume, *The Corps of Engineers: The War Against Germany*. (2) *Engineers of the Southwest Pacific*, Vol. VII, *Engineer Supply*, p. 195.